NINETY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

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THE IRON AGE

PRODUCTION -:- MANAGEMENT MARCH 15, 1934 PROCESSES -:- NEWS

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THE IRON AGE — March 15, 1934

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THE IRON AGE PUBLISHING COMPANY

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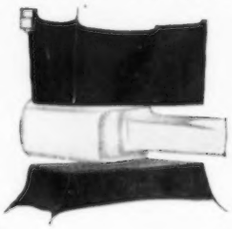

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The exact heating, soaking motor-driven cylinder on which the edge of Possibilities of human error are eliminated.

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BETHLEHEM STEEL

BETHLEHEM TOOL STEELS

▲▲▲ THE IRON AGE ▲▲▲

MARCH 15, 1934

ESTABLISHED 1855 Vol. 133, No. 11

How Many Straws Will Break the Camel's Back?

THAT is a question that is uppermost at this time in the minds of men in the metal-working industry.

The metal-working industry has been "in the red," as a whole, for three years. This applies equally to the producers of metals and those who fabricate them into machinery and finished products.

There have been some exceptions, it is true, but they have been few indeed. The industry as a whole, so closely tied up with the production of capital goods, had, prior to NRA, been bleeding away its surplus until it had reached a condition of pernicious anemia.

Then came the inspiring call of the President, last June, for united action by industry to raise wages and shorten hours.

As good soldiers and good citizens, the employers in the metal-working industry responded to this call almost to a man. Hours were shortened, wages raised, largely at the cost of additional drains upon diminishing surpluses. Prices were *not* increased even sufficiently to cover the increased wage cost and the additional cost of purchased materials.

As a result of this unselfish and patriotic cooperation and through the increases in cost which resulted, the breakeven points of metal producing and metal fabricating plants and of machinery builders have been increased to an extent that, even with present increased volumes, the industry is largely operating for the benefit of its labor and its customers.

The industry was content to make this contribution to the cause of national recovery in the hope and expectation of reestablishing a profit margin with increased volumes in the near future.

But now that increased volumes are in prospect, additional straws have been laid upon the willing camel's back.

The President asks for shorter hours and higher wages.

The Consumers' Board seeks to obtain bureaucratic control of price and cost information, shutting out the code authorities.

Senator Wagner attempts to deliver an historically "open shop" industry into the hands of organized labor.

Organized labor, in turn, threatens to tie up steel and the automotive industry, on the inconsequential grounds of "recognition."

No one has as yet suggested that Government, in taking over the functions of management in industry, shall also assume responsibility for payrolls and for dividends.

It may come to that if additional straws are laid upon the camel's back.

J. W. Vaughan

Fatigue Characteristics

SPRINGS are classed among the most ancient of machinery elements, but until the advent of railroad demands they received little attention from design engineers. The transition from the haphazard carriage suspension to the heavy elliptics of freight cars was abrupt, and when the additionally severe operating demands of airplane and automobile manufacturers were voiced, the design and metallurgical fundamentals of helical round-bar compression springs began to be meticulously examined. In THE IRON AGE of March 1 there appeared the first description of a quantity production of heavy duty coil springs, and this article elaborates that information by presenting experimental data for the proper evaluation of commercial spring characteristics. As spring action is primarily affected by the material used, this review naturally concerns itself with permanent set, stress, and fatigue measurements of the more usual spring compositions.

WHEN the airplane designer changed landing gear suspensions from rubber to helical springs, the pilots began to experience trouble because of spring failures.

Spring design is controlled by limitations on the space available for mounting the spring and a desire to reduce the weight to a minimum. Consequently, attempts were made to operate the experimental springs at such capacity that the deflection under load was anywhere from 70 to 100 per cent, and the hardness was permitted to exceed 500 Brinell in the hope of obtaining better load-deflection characteristics. Fatigue as a cause of failure was not considered, as very little reliable data on the fatigue limits of coiled springs of the type used for landing gears were available. The number of spring failures has recently been reduced by lowering the hardness and by the replacing of the springs after 400 flying hours. An investigation, the results of which are reported in this paper, was undertaken in order to obtain data on commercial springs which would be of use to engineers in anticipating the life of springs in service, and to metallurgists for the correction of faults in fabrication.

The nominal dimensions of the springs selected for the series of tests are given in Fig. 1. The springs were purchased on a non-competitive basis. Each manufacturer, however, was informed of the purpose of the test and requested to select a material and manufacture two sets of springs, one from ground and one from unground wire in accordance with a practice which would produce a spring of the highest quality, and conforming to the following specific requirements:

a. The coil concentric with the axis within 1/16 in.

b. The ends of the springs ground square so that when the spring is resting on a surface plate the vertical axis will not deviate more than 2 per cent from the vertical. One per cent is equivalent of 1/64 in. per in. length of spring. The seat to cover a surface not less than 270 deg.

c. The spring wire to be tapered uniformly at each end for a length equal to 270 deg., ± 20 deg. of the circular coil, and have a thickness at the tip of approximately ¼ the diameter of the original material. The shoulders between the tapered end and the circular sections to be rounded to avoid sharp edges.

d. The variation between the spacing of the several coils not to be greater than ± 5 per cent from that specified. The end spaces to taper uniformly from zero to full spacing within 360 deg. and not less than 270 deg.

There was no unanimity of opinion with regard to the most desirable material, and four types were furnished. These were acid open-hearth high carbon, basic electric high carbon, basic electric chrome-vanadium, and silico-manganese. All the springs were coiled hot from ground and unground wire, except those manufactured from electric high carbon steel which were coiled cold from centerless ground wire, and one set burnished after coiling. Springs manufactured from cold drawn heat treated beryllium bronze were included in order to obtain comparative data. The chemical compositions and heat treatments of the materials are given in Table 1.

In order to obtain the relationship between the fatigue characteristics of the coiled springs and the physical properties of the spring wire, several 18-in. lengths of each material were heat treated by the manufacturer with the springs. These rods were used for the tension, torsion and fatigue specimens.

Springs Examined by Magnaflux

The steel springs were examined by means of the improved Magnaflux apparatus of A. V. DeForest. The spring forms part of the secondary circuit of a small transformer. A

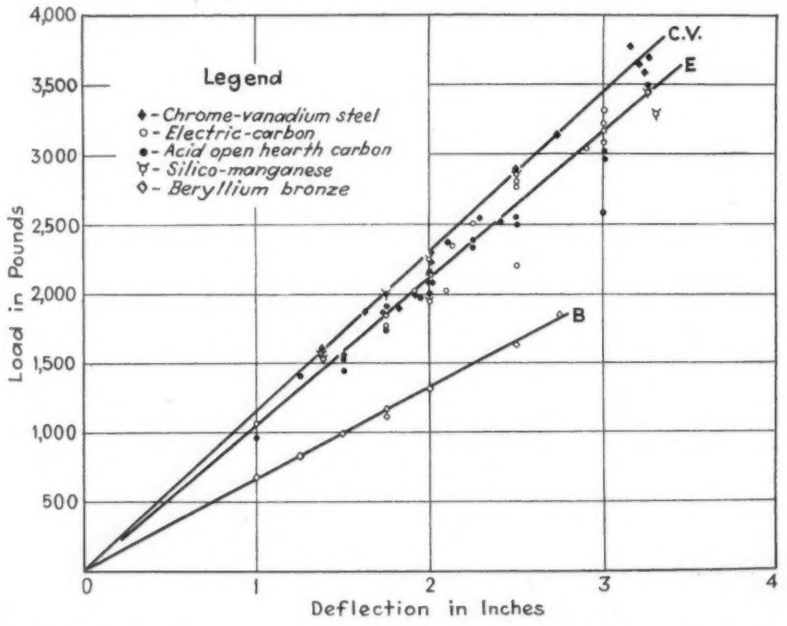


Fig. 1—Load-deflection curves for the five materials considered in this test. The relationships are fairly linear for the four steels, and particularly linear in the case of beryllium bronze. The dimensions of all the springs were 7.75 in. open height, 4.45 in. closed height, 0.562 in. wire diameter, and 3.25 in. outside diameter of coil, and each spring consisted of 8 coils.

# of Helical Springs

By J. B. JOHNSON
Chief of Materials Branch, U.S. Air Corps, Wright Field, Dayton, Ohio

secondary current of approximately 5 amp. flowing through the spring produces a magnetic field whose lines of force are distorted by surface cracks or seams, thereby causing a localized flux concentration which can be detected by the piling up of Magnaflux powder. The surface should be free from rust and scale. The cold drawn electric carbon steel springs were entirely free from cracks, but a few of the alloy steel springs and many of the acid open-hearth springs showed definite seams, both in the ground and unground condition. The seams were marked with red paint so that their effect on the fatigue properties could be determined.

TABLE I

Type		High Carbon Acid Open Hearth	High Carbon Basic Electric	Chrome-Vanadium Basic Electric	Silico-Manganese Basic Electric	Beryllium Bronze
Chemical Composition	Carbon	0.91	1.04	0.52	0.53	Copper 2.38
	Manganese	0.38	0.36	0.66	0.83	Beryllium 97.60
	Silicon	0.16	0.16	...	1.96	
	Phosphorus	0.036	0.015 *	...	...	
	Sulphur	0.037	0.018	...	...	
	Chromium	....	...	0.88	...	
	Vanadium	....	...	0.21	...	
Heat Treatment	Temp. for coiling	1700 deg. F.	Cold	Hot	Hot	Cold
	Temp. for hardening	1575 deg. F.	1550 deg. F.	1600 deg. F.	1600 deg. F.	
	Time for hardening	....	20 min.	40 min.	40 min.	Heated 520 deg. F.
	Quench	Oil	Oil @ 120 deg. F.	Oil @ 130 deg. F.	Oil @ 130 deg. F.	for 2 hr. after
	Temp. draw.	940 deg. F.	800 deg. F.	810 deg. F.	860 deg. F.	coiling
	Time draw.	Lead—1 min.	Lead—15 min.	1 hr.	1 hr.	
	Quench	Air	Air	Air	Air	
Physical Properties	Prop. Limit, lb. per sq. in. (0.0001 in. per in.)	144,000	144,000	140,000	132,000	110,000
	Yield Str., lb. per sq. in. (0.002 in. per in.)	179,000	194,000	229,000 [1]	210,000 [1]	132,000 [1]
	Ultimate Str., lb. per sq. in.	225,000	237,000	237,000	236,000	166,000
Tension	Elongation, 2 in. per cent	7	5	11	12	5
	Mod. Elasticity	30,200,000	29,800,000	30,200,000	29,100,000	18,200,000
	Ratio Yd. Str. / T. S.	0.80	0.83	0.96	0.89	0.83
Torsion	Yield Strength	118,000	126,000	141,000	141,000	95,000
	Mod. of Rupture	173,000	194,000	183,000	190,000	110,000
	Mod. of Rigidity	10,800,000	10,800,000	11,200,000	10,700,000	6,500,000
	Ratio Yield Str. / Mod. Rupture	0.68	0.64	0.73	0.74	0.86
Hardness	Brinell, 3000 Kg.	438–450	430–470	477–488	438–457	303
Fatigue	*Rotating Beam*					
	Fatigue Limit, lb. per sq. in.	80,000	98,000	104,000	112,000	30,000 [2]
	With 60 deg. V Notch	36,000	48,000	28,000	35,000	16,000 [2]
	Ratio F. L. / T. S.	0.36	0.41	0.44	0.48	0.18
	Ratio F. L. Notch / F. L. Std.	0.45	0.49	0.27	0.31	0.53
	Torsion					
	Fatigue Limit [3] (0 to max.)	102,000	123,000	128,000	138,000	30,000
	Fatigue Limit [3] (reversed)	52,000	.....	75,000	.....	16,000
	Springs [4]	73,000	98,000	82,000	75,000	37,000
Ratio	Torsion / F. L. Beam =	0.65	.....	0.72	.....	0.53

[1] 0.001 in. per in. [2] 300,000,000 cycles. [3] Polished straight specimens. [4] Springs at 1,000,000. Cycles (0 to max.).

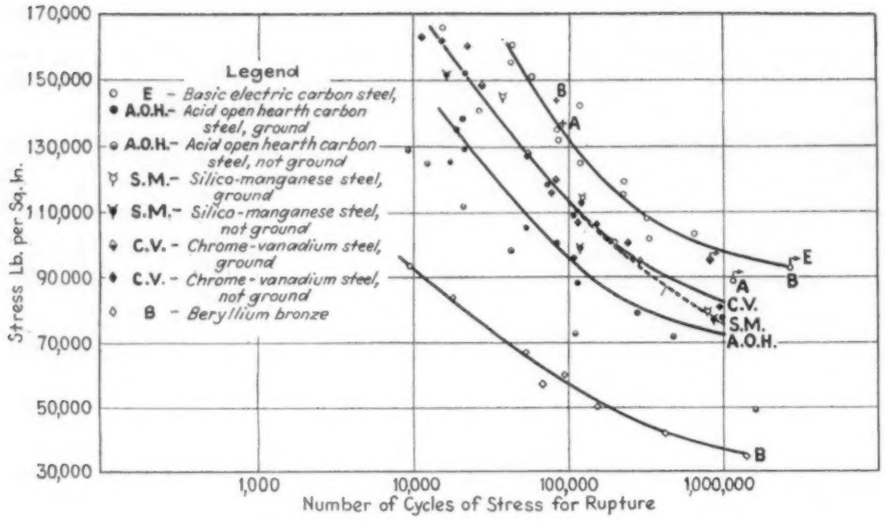


Fig. 2—Stress-cycle data for helical springs, which shows comparative data for silico-manganese, chrome-vanadium, and acid open hearth carbon steels in the ground and unground conditions. The points were obtained by running each spring to failure at a predetermined deflection.

Each spring was twice closed solid before fatigue tests were started. This operation was found to be necessary, as it evidently had not been performed on some of the springs by the manufacturer. This was evident from the fact that the first loading often gave small permanent sets. The load-deflection characteristics are plotted in Fig. 1. This is a composite graph in which each point represents the load and deflection at which a spring was tested in fatigue.

The fatigue tests of the springs were made by repeated compression in a punch press having a throw of 2⅞ in. and operating at 60 strokes per min. The spring rested on a ¾-in. plate, which was attached by bolts to the lower side of the bed plate, and which flexed slightly when the load was applied. The test was continuous except for the intervals necessary to measure the permanent set. Breakage of the spring caused a photoelectrically operated cut-out to stop the press. The several points on the fatigue graphs, shown in Fig. 2, were obtained by running each spring to failure at a predetermined deflection. For all deflections 2⅞ in. and less the stress cycle was from zero to maximum, but since the stroke could not be adjusted for greater deflections, the more heavily loaded springs operated at a minimum load of from 200 to 400 lb.

The torsional fatigue characteristics of the rod were determined on polished specimens, ground to a diameter of 0.25 in. in the test section and tested on a H. F. Moore machine.[1]

Tests were made for complete reversal of torsional stresses and for the range from zero to maximum. The tests were stopped one or more times at the start in order to adjust the range of stress, as some of the specimens took a small permanent twist comparable to that taken by the springs below 5000 cycles at the higher stresses.

Rotating beam tests were made on polished specimens on the R. R. Moore machine on both standard specimens and similar specimens with a 60-deg. circular groove in the middle. The groove was cut with a 24 pitch standard threading tool to a depth of 0.025-in. and a 0.003-in. radius at the bottom. The depth was approximately 8 per cent of the diameter. The grooved specimens were also tested under torsional loading.

Use of Stress Formulas

The deriviations of the formulas ordinarily used for determining the stresses in a spring and a straight specimen are similar. The formula for the torsional stress in a spring is:

$$f_s = \frac{8\,P\,D}{\pi d^3}$$

f_s = shearing stress in outer fiber.
P = load.
D = diameter of coil.
d = diameter of wire.

In the case of springs manufac-

[1] Fatigue Tests in Shear of Three Non-Ferrous Metals. By H. F. Moore & R. E. Lewis. A.S.T.M. Volume 31, 1931, Par. 2, page 236.

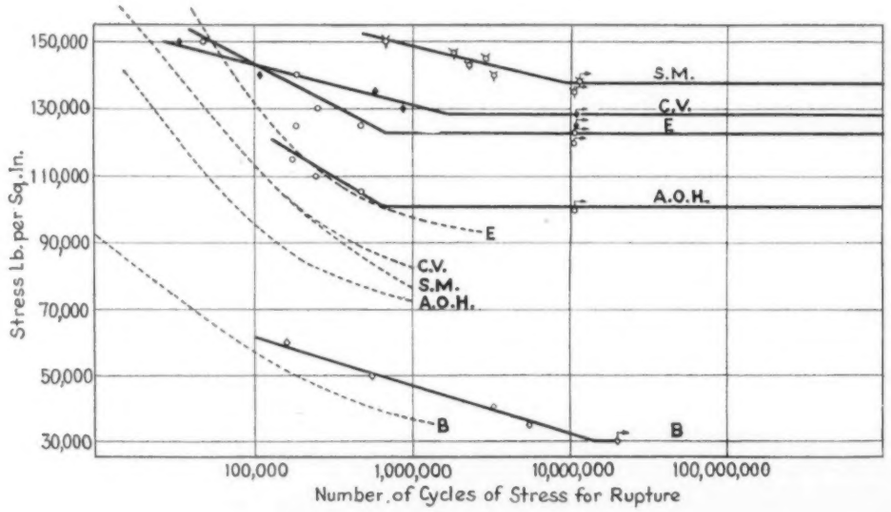


Fig. 3—Stress-cycle diagrams for helical springs (dotted) superimposed on those for polished specimens (range from 0 to maximum). Rotating beam method was employed to obtain the data. The legend is the same as in Fig. 1.

tured of relatively large wire closely coiled, it has been found that the differences in the length of the fibers on the inside and outside of the coil have an important influence on the maximum stress in the spring. A formula has been derived and experimentally verified for the maximum fiber stress on the inside of the coil.[2]

$$\text{max. } f_s = \frac{8PD}{\pi d^3}\left(\frac{4c-1}{4c-4}+\frac{0.615}{c}\right) = \frac{8PD}{\pi d^3}\times 1.3$$

c=D/d or 4.8 for this particular spring.

This factor and formula were used in calculating the ordinates for the graphs in Fig. 2, although it is applicable only within the elastic range of the material. The approximate coincidence of the graphs for the polished specimens and springs of beryllium bronze, shown in Fig. 3, indicate that this method is reasonably accurate.

Permanent set in the springs was measured at several periods during the operation of the fatigue tests. The carbon steel springs which were tested at loads giving less than 70 per cent of the maximum deflection showed no permanent set. The alloy steel springs were stiffer, as set did not take place until the deflection exceeded 80 per cent. The set was a function of the load and the number of cycles, although it was found, as shown in Fig. 4, that after from 3000 to 5000 cycles there was no increase in set. The set at 90 per cent of the maximum deflection was practically the same for all compositions.

Next week the author will conclude this discussion of commercial springs. The microstructures of the spring materials will be shown, and a careful tabulation given of the mechanical properties with particular emphasis on the fatigue limits.

[2] Stresses in Heavy, Closely Coiled Helical Springs, Axially Loaded. Mechanical Engineering, Vol. 51, No. 6, page 434. A. M. Wahl.

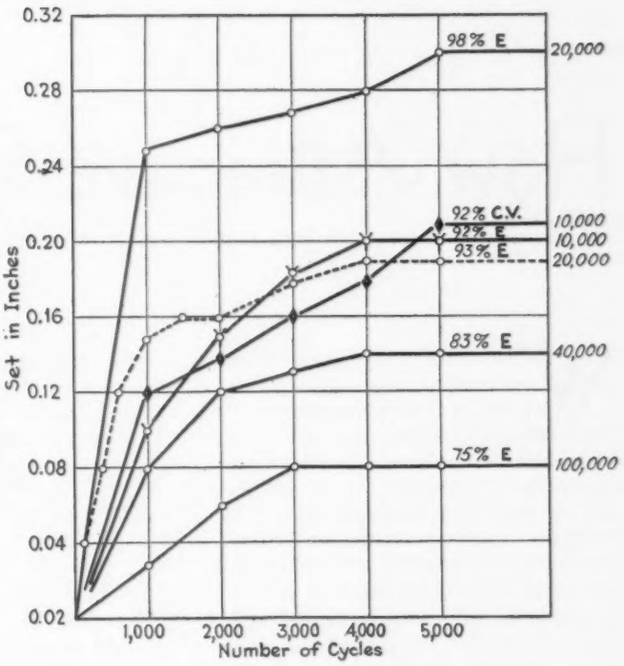


Fig. 4—Showing the set as a function of the load and number of cycles, although, as indicated, the set does not increase after from 3000 to 5000 cycles. The figures to the right indicate the number of cycles at the conclusion of each test, and the figures on each curve indicate the force applied in each case, in terms of the total force required to completely close the spring.

Electric Gas Cleaning for the Tata Blast Furnaces

By A. E. HIRSTH
Superintendent, Blast Furnaces
Tata Iron & Steel Co., Ltd., India

AFTER considering various types of blast furnace gas cleaning plants, the Tata Iron & Steel Co. in 1933 placed an order with the Lodge Cottrell Co., Birmingham, England, for an electric cleaning plant of 14,500,000 cu. ft. per hr. capacity to clean gas down to a maximum of 0.009 gr. per cu. ft. This type of plant was selected on account of the low power consumption as compared to other types of plants. Although the original outlay is much greater than for other plants the power economy more than offsets the additional expenditure.

The Tata blast furnaces at Jamshedpur like many others have been enlarged in the hearths, boshes and inwalls without increasing the throat diameter and the high blast volumes blown at present result in the dust content of the dirty gas averaging 15 gr. per cu. ft. The original construction provided two 24-ft. diameter dustcatchers to each furnace. The four up-takes on the furnace tops are brought into two downcomers, one entering each dustcatcher.

In rearranging the gas layout, new downcomers and all gas piping were designed to keep the gas velocities under 33 ft. per sec. This resulted in the largest mains working out at 14½ ft. in diameter. An additional dustcatcher 36 x 65 ft. was also provided for each furnace. Due to space and time required for filling and emptying water seals of suitable size, plate valves of the McGee thermal expansion type of 10 ft. diameter were provided at each furnace for isolation purposes.

Precipitation in Two Stages

The cleaning plant proper starts with four primary coolers 16½ ft. in diameter and 65 ft. high. These are equipped with sprays in the top controlled by a thermostat for maintaining the gas temperature leaving the tower as near as possible at 167 deg. F. The gas enters the top of the tower, leaves at the bottom and passes up to the entrance of the pretreater or dry precipitation chamber. Each precooler handles the gas for two pretreaters. A constant difference of 36 deg. F. is maintained between the gas temperature entering the pretreater and the dew point temperature, to avoid any possibility of condensation in the pretreater. There are eight pretreater units

(*Concluded on Page* 80)

How Attractive Finish Helps Metal

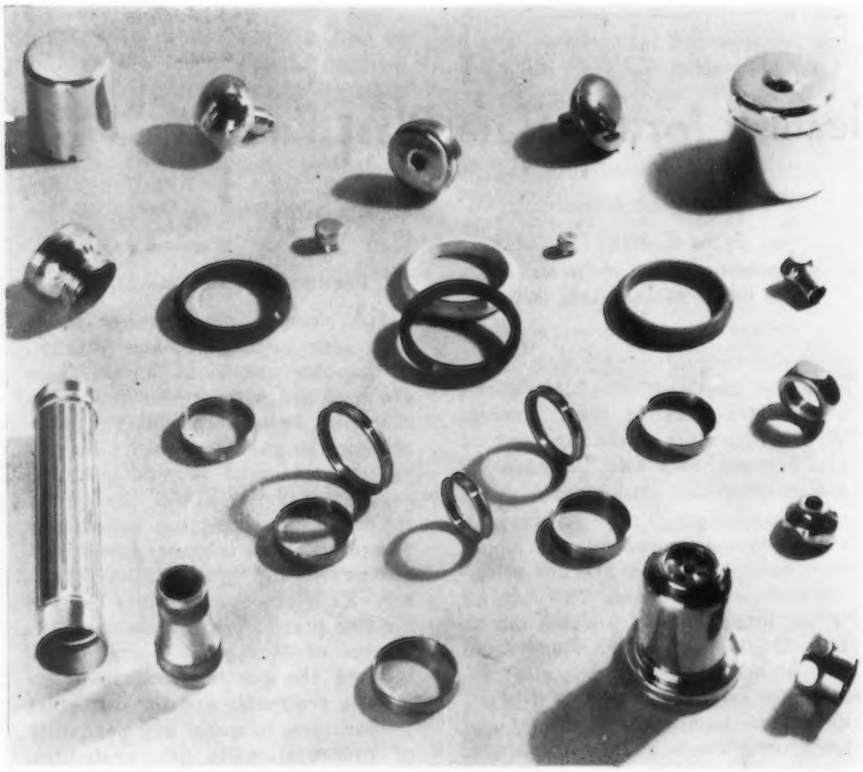
By HERBERT R. SIMONDS

WHY should metal products be polished? To answer this question with some degree of thoroughness would require (1) a definition of polishing, (2) an analysis of the buying habits of people, (3) a review of the many practical values of polished surfaces, and (4) a discussion of some basic manufacturing costs and principles.

A sales manager of a machine tool company once stated that competition in the commercial field usually determined the degree of finish applied to a tool or to a metal part. This is undoubtedly often the case, yet there must be some limit or some point of maximum sales appeal. The manufacturer of a wrench might develop a higher gloss finish than that of a competitor, but a third wrench maker might find a still better sales value with a new dull matte finish.

No final or set rules for sales value of finish have been established and probably none can be, because style is an important factor and style changes. A few generalities may be given:

1. Suit the finish to the product.
   Too high a finish on a mechanic's tool may be as poor policy as too dull a finish on a vanity case mirror.
2. Make use of color and contrast.
   A dull handle may enhance the value of a polished shank.
3. Novelty is an important attention-getter.
   Any too well established routine of finish is dangerous and needs careful watching.



This illustrates some of the products which are polished on automatic equipment on a quantity basis at low unit cost.

Defining Terms

The term "polishing" frequently is applied to three distinct processes—flexible grinding, polishing and buffing. All three of these, in distinction to grinding and lapping, are not precision processes.

Polishing is defined as a process of brightening metal surfaces by means of a somewhat flexible or resilient wheel coated with abrasives. Its purpose is chiefly appearance. Yet this definition does not always hold, for sometimes the abrasive wheel is omitted. For instance, wire is polished by drawing it through a clamp containing abrasive material.

Buffing also is a process using abrasives and flexible wheels, but it is distinguished from polishing by the fact that the abrasives are fed on to the wheel during the operation, whereas in the case of polishing the abrasive agent is glued to the wheel before use.

In practice there are other distinctions. The wheels used in buffing usually are made of muslin disks fastened together, and the abrasive is usually finer than No. 220, while the grain sizes used in polishing vary from about 120 to 220.

Buffing is most frequently used to produce luster on plated surfaces or on non-ferrous metals. Polishing is used for final finish on such items as shovels, kitchen ware and machine tools, and in addition is used as a preliminary operation for most buffing, and as a matter of fact for most metal finishing of any character.

Polishing and buffing are so closely associated that the processes overlap and the terms are not well defined. A mixture of glue, tallow and fine emery is offered in tubes as a compound to use on buffing wheels. When this is used for luster work it violates many of the features of buffing and yet is called buffing.

The Polishing Industry

The manufacture of buffing and polishing wheels in 1929 was valued

Products Sales

Polishing and Buffing—13

at $4,590,000, according to Government figures. This was exclusive of abrasives and compounds. When it is considered that the cost of the wheel is but a small part of the labor and expense of polishing, some idea of the extent of the whole industry may be had.

Yet conditions within this particular branch of metal working are not up to the standards of some other branches. The polishing industry, in general, is in a state of chaos, according to B. H. Divine, president, Divine Bros. Co., Utica, N. Y., who states: "Costs are altogether too high, mechanical operations are often performed in a crude and inefficient manner, and standardization is conspicuous by its absence."

Doctor Hutton, head of the British non-ferrous metals research association, in discussing this question recently, said: "For some reason or other, most manufacturers in the metal industry seem to be much more keen on devoting time and money to developing other sections of their manufacture, and the polishing room is left as the 'Cinderella' of the works. Whereas, of course, it is one of the most expensive factors of production in many manufacturing plants, and would yield great economies if properly brought up to date."

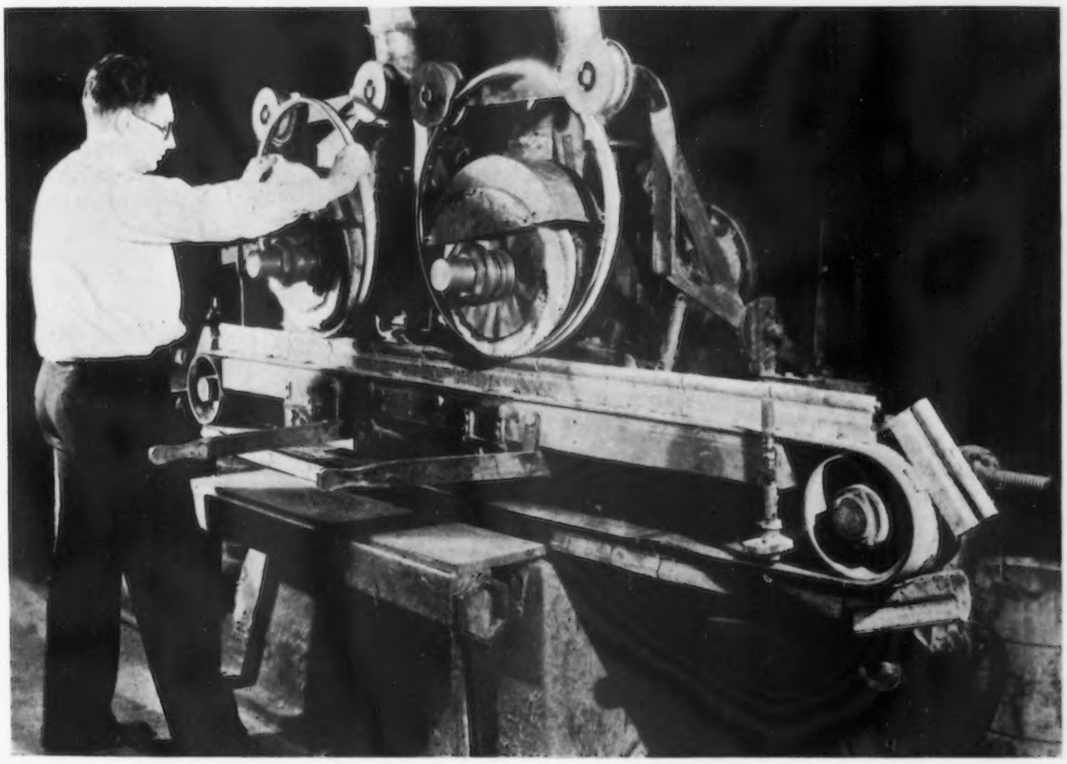
METAL polishing usually pays big dividends in added sales value, yet the art of polishing is complicated, largely unstandardized, and often much more costly than necessary. This article presents some of the important features of the art as a whole and attempts to show how the precepts of established manufacturing practice may be applied to polishing and buffing, to the end that costs may be reduced and results more nearly suited to requirements.

These statements if taken seriously should have the effect of focusing the attention of manufacturers on their polishing operations. As indicated in previous articles in this series, all finishing processes should take their places in the production line in efficient high output operation. In spite of the lack of standardization in polishing generally, equipment is not lacking for automatic and semi-automatic processes of specialized character, and individual practice of a high order is to be found in nearly every classification of polishing.

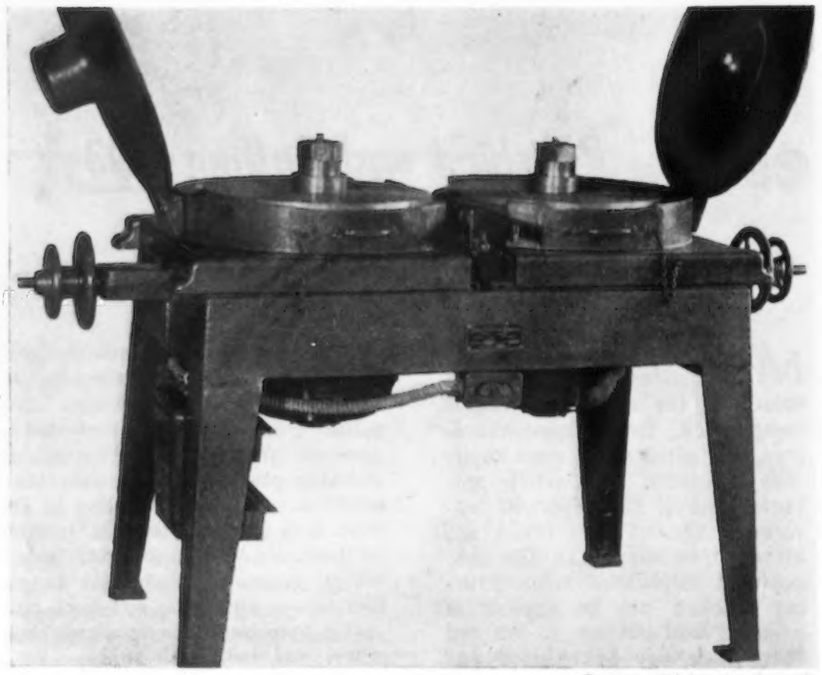
Seven Classifications

Nearly all polishing and buffing is done for one of the following seven reasons:

1. To give better sales appearance. This includes much of the polishing on miscellaneous products from razor handles to automobile bumpers.
2. To give better wear. Examples are automobile flat leaf springs and textile parts.



Rings for bicycle wheels are buffed on a production basis on this ingenious machine



Courtesy Divine Brothers Co.

Maximum production of small polished items is effected on this double head horizontal polishing machine.

3. To give resistance to corrosion.
   This includes sheets, rods, certain instruments and some machine parts. Steel, if given a sufficiently high polish, will remain free from rust for years.
4. To give mechanical smoothness.
   Examples are shovels, needles, and textile parts.
5. To give an impervious surface.
   Inside surfaces of kitchen dishes and food containers come under this head.
6. To facilitate inspection.
   Cracks, especially in forgings and castings, show up more readily after polishing.
7. To prepare surfaces for plating, enameling, etc.
   Nearly all metal surfaces to be plated are first polished, but they are polished again after plating, and the second operation comes under the heading of sales appearance.

The character of surface treatment varies to a large extent with the classification under which the polishing falls. If edges of a casting are to be kept square and true, the polishing technique must be adjusted accordingly. The great mass of detail which must be considered in solving any production polishing operation is well illustrated by the 67-question data sheet which the Divine Bros. Co. asks its customers to fill out. A few of these questions are listed here:

Of what material is the part made?
  If of steel, state percentage of carbon; if alloy steel, state kind, as nickel steel, vanadium steel, etc.; if of brass or bronze, state kind, as high brass, red brass, phosphor bronze, etc.
Has the part been heat-treated? If so, how?
Is shape of outside subject to change to permit economical finishing?
What method of manufacture was used in making piece?
  Casting, rolling, forging, stamping, drawing, etc.
Is piece annealed before it comes to polishing operation?
What is character of original surface to be finished?
  Machined, sand cast, pitted, covered with scale, etc.
How was scale removed?
  Sand blast, pickled, tumbled, ground.
If pickled, is metal pitted? If so, how deep are pits?
If sand blasted, what grade of sand is used?
If machined, what was the final operation?
  Turning, milling, planing, grinding, etc.
How deep are the tool marks?
If ground, what was the grain and grade of the final wheel?
What character of surface is required on finished pieces?
  Accuracy, as for machine parts; mirror finish on bare metal, or finish for nickel and chrome plating, painting, japanning, etc.
Must flat surfaces be kept approximately flat?
Quantity of production.
If quantity of this part is insufficient to warrant automatic operation, are there other parts on which the same automatic operation could be used?
Must corners and edges be held square?

Design for Polishing

An automobile manufacturer had a satisfactory contract for polishing bumper bars on its 1933 cars and assumed the same terms would carry over to its 1934 design. To its surprise the quotation which came back for polishing the new bars was almost double the previous rate. Investigation revealed that the curve of the new bar was too great to pass under the hinged wheel head of the polishing table. Thus expensive equipment alterations were called for before the work could be done.

One authority on polishing has said: "Polishing begins in the drafting room." Wheels of large diameter are more economical to use than wheels of small diameter. The article to be polished should be designed, therefore, to eliminate all unnecessary projections, depressions, angles, recesses, or reverse curves, which can be polished only with narrow or small wheels at excessive costs. Usually the cost of any extra metal or machining involved in the altered design can be more than offset by the saving in polishing.

A 16-in. wheel presents over 12 in. more of surface to the work than does a 12-in. wheel, and it therefore has more time to cool and its operation is correspondingly better.

For some types of finish a surface which comes from a milling machine will be easier to buff than if it came from a face grinder. In this case design may play a part, but the scheduling of preceding operations is the chief factor.

Preceding Operations

In a recent paper Mr. Divine gave considerable space to the important subject of operations which precede polishing. He said in part: "The cost of correction in the polishing department usually exceeds the cost of correction in the department where the incorrect condition originates. There is often continual strife between the polishing and other departments on this point, whereas care in planning would prevent such conditions. This is one of the underlying causes of the high cost of polishing."

An example of what can be done to help polishing by a study of previous processes is the experience of an axe factory. The forged axe when it left the dies was true to contour, but with an extra thickness of metal to allow for grinding off the scale. The solid-grinding operation to remove the scale destroyed the contour and left the surface in scallops or waves. It required at least three operations, which should not have been necessary, to restore the contour and prepare the surface to take a polished finish. The installation of a cheap and simple process for removing the scale while the metal was red hot eliminated the solid grinding and several polishing operations, and greatly reduced the cost of finishing.

The polishing department receives work either rough or with a machined surface, and when castings are to be polished without previous operations care should be taken to see that sprues, ragged edges, lumps and surface defects are removed, as, independent of any trouble which these features may cause, the cost of removing them in the polishing department is excessive. In the case of forgings, it is good practice to pickle or sand blast before polishing. Deep tool or grinding marks necessitate the removal of too much metal when the polisher is called upon to reduce the entire surface to the level of the bottom of such marks. Where scratches and drawing marks appear on stampings or drawn work, the labor and expense required to correct the dies or otherwise eliminate the cause of these marks is well justified by the overall saving. To sum all this up, work should be delivered to the polishing department in a condition which will make it unnecessary for that department to correct the errors of other departments.

Polish Rolls, not Sheets

One rolling superintendent has said that it is better to put the work of finishing on the rolls than it is to try to put it on the sheets. The first case accomplishes the result with less expense. Often the difficulty may be traced back of the rolling to the furnace. Clean material of proper analysis in the furnace is essential to the production of a fine finish. Some material which is properly rolled and properly polished will have many pits, and when these are polished away more pits will appear underneath. This is due to defective structure of the material itself.

Engineers of the Norton Co., Worcester, Mass., who have studied carefully this phase of the subject, feel that they cannot emphasize too strongly the importance of rolling practice in the polishing efficiency. One engineer has said: "The cost of polishing sheets is dependent upon the efficiency in rolling the sheets. A better set of rolls will give a better finish and will materially reduce the cost of polishing."

Often a polishing engineer will be called in to correct trouble with abrasives or polishing wheels only to find that the trouble is actually with the base metal or with preceding operations.

Polishing at Mills

The arrival of stainless steel stimulated polishing at the steel mill and the trend today is toward more and more finishing of material at the source. Polished, rolled metal products are now fairly common raw materials for the fabricator.

Steel sheets are polished at steel mills for appearance and a somewhat increased resistance to corrosion. This operation frequently is performed on either Schulte or Mulholland machines of established character. The sheet is held on an oscillating table while an endless belt passes over a small, revolving, flexible roll. The belt is coated with abrasive, which is thus brought into contact with the sheet.

Polishing is sometimes used to remove scale, in which case a relatively rough polishing wheel is used. Stainless steel sheets at the mill, after coming from the last rolling operation, are pickled, then rerolled and then polished. The pickling leaves the sheets pitted, the rerolling tends to reduce the depth of these pits, and the polishing then removes the balance of the pits. The polishing of stainless steel sheets is usually a dry operation, using alundum No. 80, or similar abrasive, but practice varies.

Sheets of average size—say 120 in. x 50 in.—are polished in from 20 min. to 30 min. at one plant. The operation here is a dry one, using No. 80 grain. After this, for certain high-grade work, a further polishing using No. 120 grain, still dry, calls for an additional 15 min., and if a better finish yet is required another operation is added, using No. 120 grain with grease—usually a mutton tallow. For a buffed finish the manufacturer adds several other polishing processes, using successively No. 150, No. 180 and No. 220 grain, and then transferring to buffs.

▲ ▲ ▲

The proper care of abrasive wheels is one of the biggest factors in polishing costs. This shows a corner of the gluing room at the South Boston wrench plant of the Walworth Co.

▼ ▼ ▼

Choosing the Right Drive—9

Horizontal and Vertical Motorized Reduction Units

By WILLIAM STANIAR
Mechanical Power Transmission Engineer
E. I. DuPont de Nemours & Co.

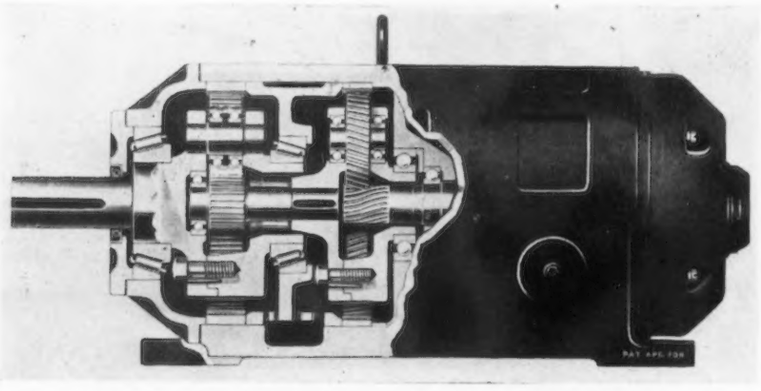
THE motorized speed reduction unit, commercially known as the "Moto-Reducer," is the most recent development of its kind by the motor and gear manufacturer. This product is available for both horizontal and vertical driving and based on its efficiency and compactness is, to a great extent, revolutionizing direct connected speed reduction in a definite field of power and ratios.

The horizontal and vertical motorized units are unique driving arrangements for use in connection with averaged power horizontal speed reduction applications and the driving of vertical mixing vessels, because of convenient design and the elimination of the usual base plates and flexible couplings. Misalinement between motor and reducer is not possible as the motor and reduction gear are one, thus permitting the unit to be rigidly coupled to the driven machine. Recent designs of the horizontal and vertical units are shown, exposing gear assemblies and slow-speed shafts, by Figs. 60 and 61. It will be observed that the ultimate has been reached in combinations of this character, as all essentials for an efficient driving and speed-reduction mechanism have been considered. These units are designed for A. C. single or polyphase motors of the open, totally inclosed, slip-ring or explosion proof types. Motors of the D. C. type up to and including 10 hp. can also be employed.

In the units illustrated the gear assemblies are of the planetary arrangement, the driving pinions having three points of contact, thereby insuring a well balanced drive. The gears and pinions are either made of heat-treated 40-50 carbon or nickel steel. The high-speed gear trains are provided with helical teeth to insure quiet operation, while the low-speed trains are equipped with standard stub teeth. In addition to the gears and shafts being mounted on anti-friction bearings, the slow-speed shaft of the horizontal unit is mounted on a generously proportioned tapered roller bearing, thereby permitting an overhung load as well as a coupled connection. The slow-speed shaft of the vertical unit is mounted on widely spaced tapered roller bearings, thereby providing sufficient bearing spread to counterbalance upward or downward thrust. This construction in the vertical unit also prevents side whipping of the extended load shaft, thus eliminating the use of step or guide bearings. Both the horizontal and vertical units are entirely inclosed in oil-tight, cast iron casings, which allows all moving parts of the gear assemblies to operate in oil and at the same time protects the motor from the damaging effects of the fluid lubricant.

Motorized Worm Gear Units

The planetary gear motorized unit has been described as experience thus far denotes it to be most satisfactory from an efficiency and general application standpoint. However, during the development of this method of power transmission other types of gear assemblies have been considered, such as the worm, spur-gear trains and various gear combinations. The motorized worm-gear unit provides an inexpensive and rugged arrangement, but in combination with a motor it is



Figs. 60 and 61—Recent designs of horizontal and vertical units of the planetary type.

MOTORIZED units, in which motor and reduction gear are one, are most recent additions to transmission apparatus. Possibilities of misalinement have been removed and the usual base plate and flexible coupling are eliminated. Horsepower capacities range from ½ to 75.

more suitable for small powers and low ratios. Reduction ratio is directly proportional to the number of teeth on the pinions and gears of a gear train, therefore this method in combination with a motor is impracticable for the higher ratios. The assembly of various gearing methods in combination with a motor has not proved popular. Both the horizontal and vertical motorized planetary type of reduction units can be obtained in power capacities from ½ to 75 hp. at permissible input speeds of 850 to 1750 r.p.m., which makes possible the use of standard speed induction motors. Slow-shaft or output speeds of standard commercial units range from 10 to 600 r.p.m., depending on the power capacity. Lower or higher output speeds are special.

The motorized unit method of direct connection possesses three definite advantages over a motor coupled to a speed reducer. Namely—lower first cost within a certain power and ratio range, lower installation costs, and less space requirements. These factors should govern choice between the two methods. There is another fact, however, that warrants consideration. Motor trouble is more serious to operations with the motorized reduction unit than with a motor coupled to a reducer. If the motor of a motorized unit fails, resumption of operation is delayed until either the motor portion of the reducer is repaired or an entire new unit can be obtained. If similar failure occurs with a motor coupled unit a spare motor, if available, can be installed immediately. Lower first cost is probably the most important of the three advantage factors mentioned. In view of this, approximate cost comparisons are given between horizontal motorized reduction units and separate motor coupled units, of the worm and spur-gear types, and between vertical motorized reduction units and motor coupled vertical worm reduction units.

Since the inception of the motor-reducer and until quite recently, development work has been concentrated on the horizontal unit; therefore there are a number of designs and arrangements of this type available. Variation of design is not yet evident with the vertical unit, probably because it is a recent utilization of the principles of the horizontal unit.

Three Types of Construction

Regardless of the different designs of gear assemblies employed in the horizontal motorized reducers, three general types of mechanical construction have been utilized in combining a motor and a speed-reduction gear. In one the motor supports the gear unit as shown by Fig. 62, in another this procedure is reversed and the gear unit supports the motor, while in another and by far the best method of the three, the motor and gear-reduction unit are both supported in one continuous cast-iron casing illustrated by Fig. 63. Prior to the introduction of this design the "gear supporting the motor" method was preferable, particularly for reduction ratios of more than 10 to 1, because motor frames which normally are subjected to low torques based on high delivery speeds have not the resistance to the increased torques of lower delivery speeds.

On a basis of first cost comparison it will be observed that from ½ to

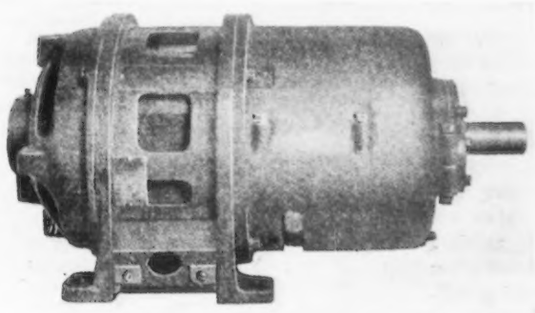


Fig. 62 (above)—In this design, the motor supports the gear unit.

Fig. 63 (at right)—Motor and reduction unit are preferably supported in a single casing.

COMPARATIVE COSTS OF HORIZONTAL MOTORIZED REDUCTION UNITS AND HORIZONTAL WORM OR SPUR REDUCTION UNIT INSTALLATIONS

Basis=1200 r.p.m. Squirrel Cage 40 Deg. Motor. Ratio 23:1.

Horsepower	Motorized Unit	Motor—Worm Reducer—Flexible Coupling and Base Plate	Motor—Spur Reducer—Flexible Coupling and Base Plate
½	$76	$86	$143
1	95	113	181
1½	102	145	204
3	166	206	230
5	216	275	248
7½	263	293	300
10	310	345	340
15	430	464	421
20	605	561	515
25	635	757	541
30	895	783	597
40	920	828	637
50	1,180	1,090	766
60	1,240	1,530	1,031
75	1,265	1,590	1,200

10 hp. the horizontal and vertical motorized units are consistently lower than the horizontal worm or spur-gear units flexible coupled to a motor with base plate and the vertical worm reduction unit flexible coupled to a motor with base plate; therefore if practicable in conjunction with other involved factors the motorized units should be employed for the driving of horizontal and vertical equipment within this power spread. From 15 to 75 hp. the price comparison is not consistent for either method; therefore choice of method in this power spread should be governed by operating conditions and location.

Group Line Shaft Driving

The horizontal motorized unit, within its power and ratio capacity, is adaptable to group line-shaft driving in both production shop and process plants because of its compactness and ease of support for the usual power requirements in this class of driving and its economy of first cost up to and including 10 hp. In production shops its use is almost limited to line-shaft driving, whereas in process plants it can be utilized for high-speed motor direct connection to various pieces of equipment. It can be rigidly coupled to apparatus where steady loads are involved and chain or belt connected from the slow-speed shaft to application where shock loads are present, based on the design permitting an overhung load on the slow-speed shaft of the unit. This factor is important in the driving of ball mills and machinery of this class.

There are instances in process plant line-shaft driving where the installation of the horizontal motorized reduction unit will show first cost economy regardless of the power requirements being beyond 10 hp. This is based on low reduction ratio demand. Naturally low-speed reduction ratio in any unit is not as expensive as the higher ratio units. A cost comparison of an actual case where selection was based on the money involved is given. Two methods were proposed for the driving of a 15-hp. line shaft at 325 r.p.m., namely—direct motor belted and direct by a horizontal motorized unit.

15 hp. at 1200 r.p.m. Motor Direct Belted to Line Shaft

	Labor	Material	Total
15 hp. motor at 1200 r.p.m. incl. rails and pulley	$25	$141	$166
Starter	...	176	176
Belt—35 ft. of 6 in. double mineral retan leather	...	70	70
Pulley on line shaft	5	8	13
Coupling and shaft extension	10	15	25
Bearing and support for shaft extension	20	30	50
Motor and starter housing	20	30	50
Motor foundation	20	30	50
Electric service and installation	45	30	75
Totals	$145	$530	$675

15 hp. Motorized Unit Direct Coupled to Line Shaft

	Labor	Material	Total
15 hp. horizontal motorized unit—1750 to 325 r.p.m.	$25	$226	$251
Starter	...	176	176
Coupling and shaft extension	10	15	25
Bearing	5	15	20
Motorized reducer platform and foundation	20	30	50
Electric service and installation	45	30	75
Totals	$105	$492	$597

It will be noted that the ratio requirement is 5.4 to 1 and that the first cost saving in favor of the motorized unit is $78. This saving does not include a maintenance saving of approximately $25 per year for belting and bearing attention.

The vertical motorized reduction unit is not required in production shop driving, whereas in the process plant it has numerous applications, because of its compactness and adaptability to various vertical driving requirements. Agitation and pressure mixing vessels of the vertical types are usually designed in such a manner that top attachment of a base plate and motor coupled driving unit is difficult, because of piping, instrument and manhole interference.

Indicated Use of Vertical Units

The vertical motorized unit should be employed for such conditions regardless of first cost because it can be applied without interfering with the obstructions mentioned. In this class of driving it has solved the problem of the objectionable step or guide bearing because the unit is so designed from a bearing standpoint that the connected load shaft of the driven vessel can be overhung without side-thrust effect. A typical installation of the vertical motorized unit driving an agitation vessel where top construction interference is evident is shown by Fig. 64. It will be observed that there is an additional cylindrical housing between the top of the tank and the bottom of the reduction unit. This is because the load shaft of this particular vessel is subjected to heavy side thrust which necessitates an abnormal bearing spread immediately below and integral with the motorized unit.

The vertical motorized driving unit has made possible the use of portable power agitation vessels which are valuable to industry in reducing material handling costs and facilitating manufacture. Usually the power required in this class of work averages between 1 and 5 hp., thereby permitting the use of an inexpensive and light-weight motorized unit. Portable driving through reduction gear by direct coupled connection to a high-speed motor has not proven practicable by other methods. By the use of the motorized unit weight regardless of power capacity is held at a minimum. The weight of the unit as compared to a motor, vertical worm reduction unit, flexible coupling and base plate is reduced by the base plate, flexible coupling and a portion of the separate housing of the worm unit.

COMPARATIVE COSTS OF VERTICAL MOTORIZED REDUCTION UNITS AND VERTICAL WORM REDUCTION INSTALLATIONS

Basis = 1200 r.p.m. Squirrel Cage 40 Deg. Motor. Ratio 23:1.

Horsepower	Motorized Unit	Motor—Worm Reduction Unit Base Plate and Flexible Coupling
½	$94.00	$126.00
1	113.00	133.00
1½	132.00	155.70
3	197.00	220.00
5	252.00	280.00
7½	310.00	346.00
10	362.00	415.00
15	505.00	494.00
20	695.00	696.00
25	730.00	721.00
30	1,020.00	962.00
40	1,050.00	1,072.00
50	1,350.00	1,114.00
60	1,410.00	1,575.00
75	1,430.00	1,640.00

Production Shop and Process Manufacturing Plant Driving

METHOD	Horizontal Motorized Reduction Unit.		
TYPE	Double support and planetary gear assembly.		
SERVICE	Direct driving of group line-shafts in both production shops and process plants where space is extremely limited and where high or moderate velocity ratio is required. Direct driving of horizontal process plant equipment where space is limited and ratio requirements are high or moderate. Direct horizontal driving where access to driving mechanism is difficult.		
MOTOR SPEEDS OF PRESENT STANDARD UNITS	850—1150—1750 r.p.m.		
GEAR ASSEMBLY RATIO CAPACITIES IN RELATION TO POWER RATING	1750 r.p.m. motor. ½ to 30 h.p.	1150 r.p.m. motor. ½ to 30 h.p.	850 r.p.m. motor. ½ to 30 h.p.
	3:1 to 88:1 Standard.	2.9:1 to 88.5:1 Standard.	2.9:1 to 77:1 Standard.
	1750 r.p.m. motor. 40 to 75 h.p.	1150 r.p.m. motor. 40 to 75 h.p.	850 r.p.m. motor. 40 to 75 h.p.
	3.4:1 to 76:1 Standard.	2.9:1 to 77:1 Standard.	2.9:1 to 71:1 Standard.
HORSEPOWER CAPACITY RANGE FOR STANDARD UNITS	½ to 75.		
LUBRICATION	Fluid lubricant by splash or circulating systems.		

For a 5-hp. at 23 to 1 velocity installation the total weight reduction by use of the motorized unit is approximately 650 lb. Such weight reduction eliminates the use of superstructure and makes possible lighter top construction of the driven vessel.

For Vertical Mixers

There are occasions when vertical mixing vessels must be placed in locations difficult of acess. This usually results in maintenance or inspection neglect of the driving mechanism. Such neglect causes trouble if the separate vertical reduction unit coupled to a motor is employed because of the flexible coupling and abnormal misalinement possibilities. This attention is, to a great extent, eliminated by the use of the vertical motorized unit, with the exception of periodic oil replacement. Motor difficulties are liable, but these are probable with either method.

This unit in small powers can be employed to a great advantage in the driving of small experimental mixing vessels due to its small size and adaptability to high-speed motors of ¼ to 1½ hp.

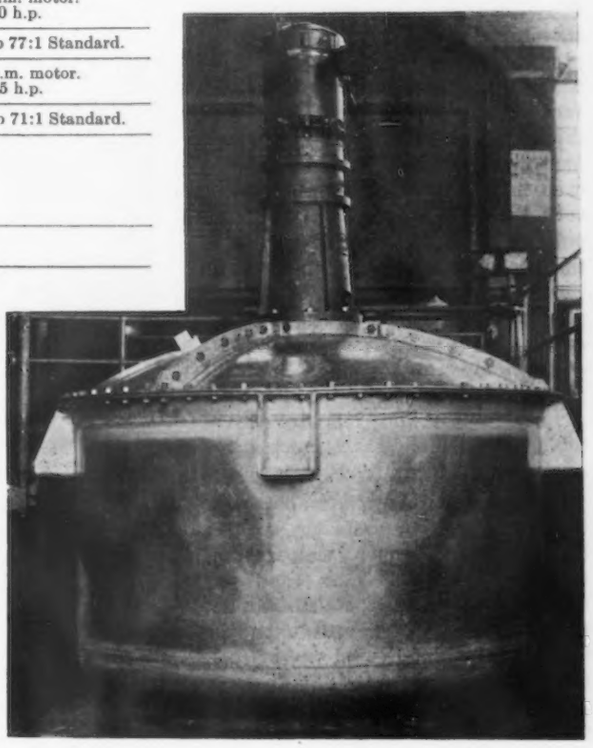


Fig. 64 — Vertical units offer opportunities for extremely compact installation with driven apparatus.

Safety Advantages

From a safety standpoint the motorized speed-reduction units are safer than other speed-reduction assembly as all moving parts are entirely inclosed; therefore it is not possible to produce an accident from contact with high or slow-speed rotating gears, shafts or motor accessories. This feature is important, based on the frequent necessity of top repair to certain classes of vertical mixing vessels.

For the average industrial power requirements the motorized vertical unit requires more headroom than the vertical separate worm reduction unit; therefore this fact should be considered before selection is made. Such headroom requirements naturally vary with the power rating and ratio capacity of the unit, but based on compact design the total height is reasonable.

Process Manufacturing Plant Driving

METHOD	Vertical motorized reduction unit.		
TYPE	Planetary gear assembly.		
SERVICE	Direct driving of vertical mixing and agitation vessels, where ample head room is available. Direct driving of vertical portable mixing and agitation vessels. Vertical driving of similar apparatus where accessibility to the power mechanism is difficult. Direct driving of experimental vertical apparatus. Direct driving vertical apparatus where the ultimate of safety is required.		
MOTOR SPEEDS OF PRESENT STANDARD UNITS	850—1150—1750 r.p.m.		
GEAR ASSEMBLY RATIO CAPACITIES IN RELATION TO POWER RATING	1750 r.p.m. motor. ½ to 30 h.p.	1150 r.p.m. motor. ½ to 30 h.p.	850 r.p.m. motor. ½ to 30 h.p.
	3:1 to 88:1 Standard.	2.9:1 to 88.5:1 Standard.	2.9:1 to 7:1 Standard.
	1750 r.p.m. motor. 40 to 75 h.p.	1150 r.p.m. motor. 40 to 75 h.p.	850 r.p.m. motor. 40 to 75 h.p.
	3.4:1 to 76:1 Standard.	2.9:1 to 77:1 Standard.	2.9:1 to 71:1 Standard.
HORSEPOWER CAPACITY RANGE FOR STANDARD UNITS	½ to 75.		
LUBRICATION	Fluid lubricant by force feed system.		

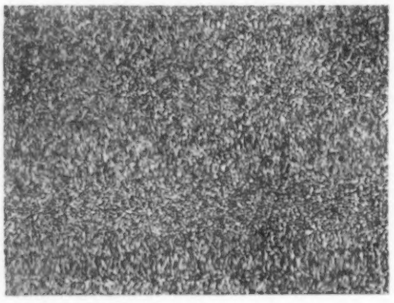
Rolling Seamless Tubes by the

ADVANTAGES of the new method of rolling seamless tubes by the "Foren" process are at once apparent. The user of tubes can specify lengths up to 100 ft. without consideration to welding short lengths together. There are no plug scratches on the inner surface which will always conform to the surface of the ground mandrel. Wall thicknesses are exceptionally accurate and uniform. The outside surface, even in the case of stainless steel, is such that cold drawing is not needed unless the buyer specifies qualities that can be obtained only by cold working. The costs of pointing, cold drawing, pickling, annealing and straightening are eliminated on most of the product of this mill. From the producer's viewpoint this mill has the advantage of rolling long lengths of tubing and thereby saves much waste in the form of crop ends.

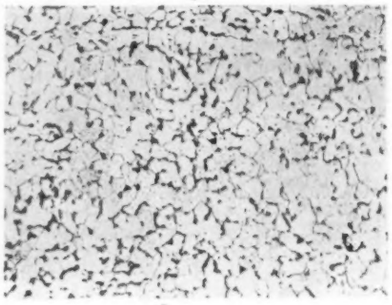
The speed of this mill is another of its characteristics, assuring working the metal at proper temperatures without reheating. Less than one minute passes from the time a billet reaches the piercing mill until the finished tube is delivered on the cooling bed. Six tubes, each 35 ft. long, pass through the mill every minute, and in a month of operation not a cobble has been made.

Range of Diameters

The present unit was designed for tube diameters ranging from 1 in. to 4 in., but larger diameters can be rolled on this type of mill. These tubes may have wall thicknesses anywhere from No. 20 gage to ½ in. thick. Several trials show that non-ferrous metals such as brass, copper, aluminum and duralumin can be satisfactorily and economically worked. The mill can be set for change of gage in about five minutes, this operation requiring only the substitution of the desired size of mandrel and adjustment of rheostats to give proper speeds. To change the diameter of tubing to be rolled is of necessity a longer job.



Microstructure of Foren-mill tubing. Low carbon steel, hot finished. Magnification 100X.

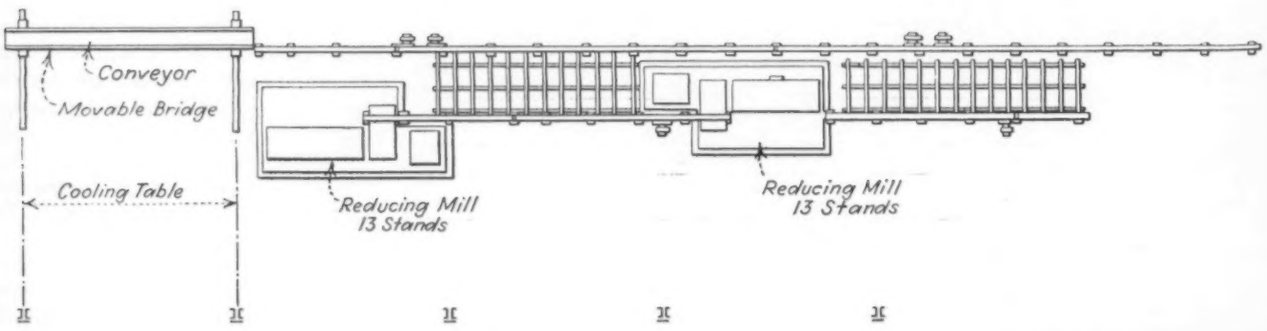


Microstructure of plug-mill tubing. Low-carbon steel, hot finished. Magnification 100X.

Billets to be heated are raised from the storage yard elevation to the charging end of an oil-fired furnace by means of an elevator. A pusher discharges the billets to a piercing mill, designed and built by the Globe company's engineers. The skew principle is used and the roll axes are adjustable in all directions. This unit is driven by a direct current motor which is coupled by means of a speed reducer. Two men operate the piercer, which is used merely to pierce the billet which is run out on a short conveyor from which it is dropped a short distance to a grating. The furnace is parallel to the main mill, while the piercing mill is at right angles to the furnace. Therefore the piercer is in effect a conveyor unit from the furnace to the main mill.

As the billet drops to the grating it rests at right angles to the main mill. Below the pierced billet conveyor is a gate which drags on the grating. As soon as a billet is dropped this gate-pusher swings 90 deg., pushing the billet before it. By this means the billet when delivered to the feed rolls of the main mill is parallel with the center line through the stands.

The billet has barely come to rest when a carrier advances with a mandrel which is run through the pierced billet. A stop on the carrier permits about one-third of the length of the mandrel to pass through the billet. At that point the stop on the carrier advances the billet, now on the mandrel, to the first pair of the five squeezer rolls, two of which are vertical and three are horizontal. The function of the squeezer unit is simply



At no point between the billet heating furnace and the cooling bed does hot steel

Foren Process

By ROGERS A. FISKE
Western Editor, THE IRON AGE

SEAMLESS tubes rolled on a centerless ground mandrel to gages as light as No. 20 and in lengths up to 100 ft. and in all grades of steel from soft carbon to stainless are among the features of a new mill constructed and put in operation by the Globe Steel Tubes Co., Milwaukee. This unit is known as the Foren tube mill, the principle and design having been conceived and directed by Pehr A. Foren, a Swedish engineer with the Globe organization.

to fit the billet close to the mandrel, which remains in the pierced billet throughout the length of the Foren mill. The rate of feeding the mill is six pierced billets a minute.

The reason for running the billet over the mandrel to a point about one-third from the mandrel's forward end is that, in rolling, the metal elongates both forward and to the rear. In fact, the 17th working stand works the metal over the front end of the mandrel, this being a necessary provision for the stripping operation which removes the tube from the mandrel.

Operations Following Squeezing

Following the squeezer rolls are 21 close-coupled stands, the first 17 of which are the working stands. Their work is divided in cycles of three and eight. These rolls stand at various angles so that at the end of the first eight passes the tube has been worked at 16 points on its circumference. The first pair of working rolls stands at 22½ deg. from the horizontal. As the tube leaves this stand it is slightly elliptical, consequently the next pair of rolls is at 90 deg. to the first pair. This also results in an elipse on the opposite axis and therefore the third pair of rolls forms the tube into a true cylinder. Each succeeding group of three rolls follows the same course.

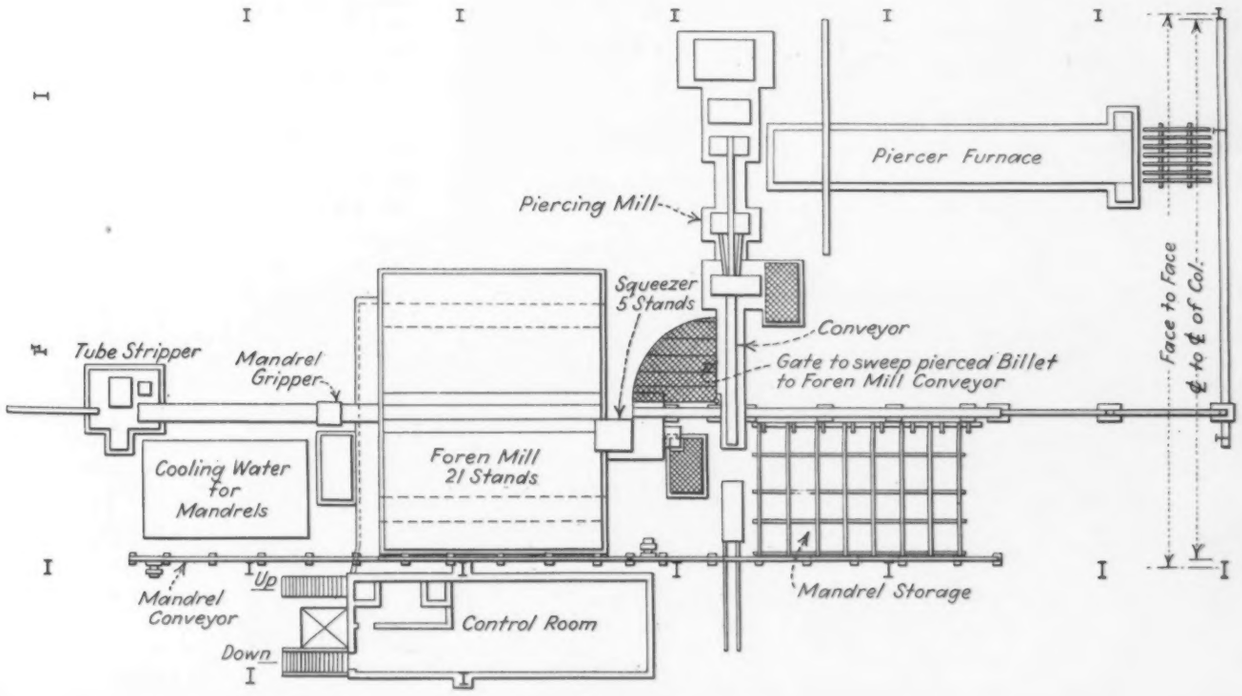
These units are extremely close coupled, center to center of roll stands being 21 in. Since each stand is driven by a separate motor it was necessary to stagger the motors in order to provide floor space for them.

No. 17 is the last working pass. After it follow Nos. 18 to 21 inclusive, which are releasing passes, the object of which is to bring the tube to a perfect circle, which has the effect of releasing the grip of the tube on the mandrel, thereby simplifying the stripping process. A reduction of area of 80 per cent is accomplished from the time the pierced billet enters the Foren mill until it leaves the 21st pass.

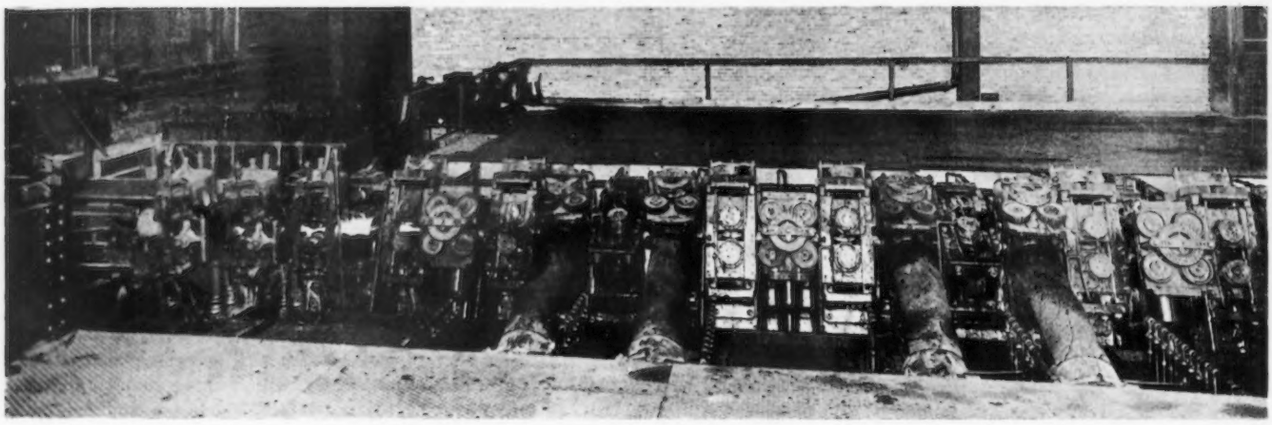
The trailing end of each mandrel is turned to form a head or knob, not larger in diameter than the mandrel. At the outgoing end of the mill is a gripper. After the mandrel has cleared the mill it strikes a stop and the gripper clamps down on the trailing end of the mandrel. Thereby the mandrel is held stationary, while the tube gripper rolls the tube off the mandrel.

"Electric Eyes" Used

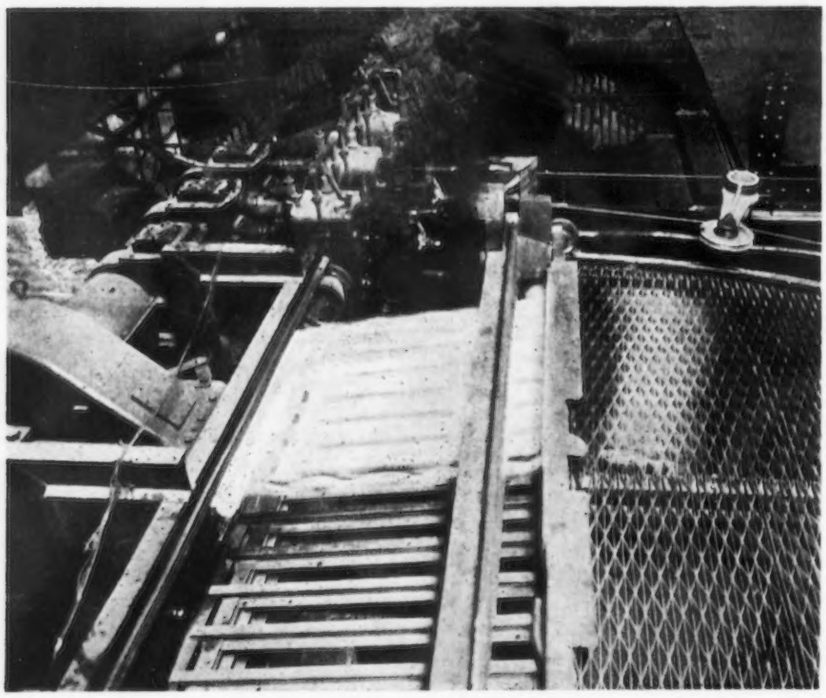
Controls for kick-offs, conveyors, etc., are operated by General Electric



retrace its path. This mill is an excellent example of straight line motion of the product.



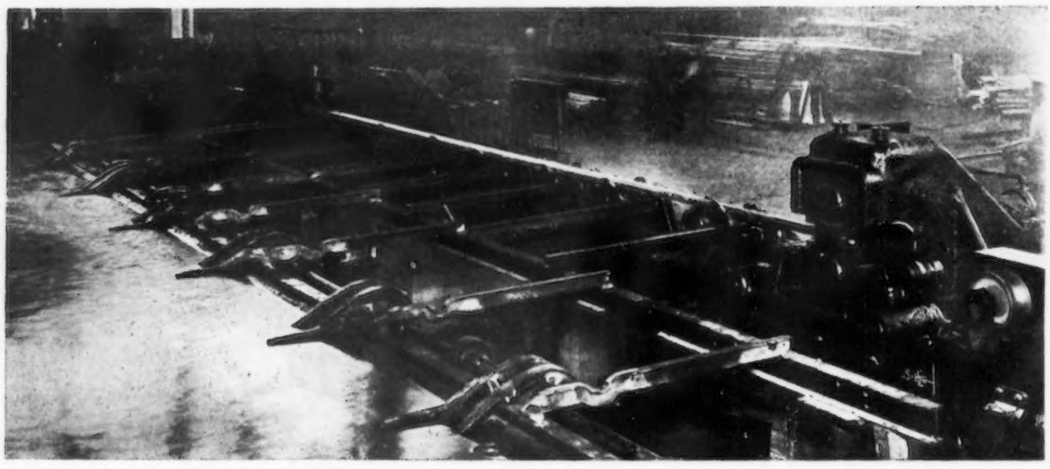
General view of the Foren mill. The first five stands at the left are the squeezers. Then come 17 working stands and finally, at the extreme right, are four releasing stands. Center to center of roll stands is 21 in.



The swing-gate has just swept a pierced billet off the grating at the right and delivered the billet to the conveyor which feeds the Foren mill.

Co. "electric eyes." For instance, the tube having been stripped from the mandrel continues down a conveyor past an "electric eye," which causes the mandrel gripper to release and a kick-off to raise the mandrel off the conveyor and deliver it to another conveyor, which operates at right angles to the main line. The mandrel is conveyed through water, to cool it, and then is automatically carried back to the rear where in its turn it is again picked up by the carrier and run through a pierced billet and the cycle is repeated.

If the tube is of the desired size it is run straight through to the cooling table. However, two reducing mills are provided. These stand parallel to the main conveyor line and kick-offs, automatically operated, are provided to remove tubes from the main conveyor to the feed tables at the entering ends of the reducing mills. The kick-off at the cooling table is mounted on a bridge which travels on short rails. By this arrangement the kick-off can be moved in line with either the main conveyor or the discharge



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At the right is the mandrel gripper and at the left is the stripper. The mandrel cooling tank is in the foreground.

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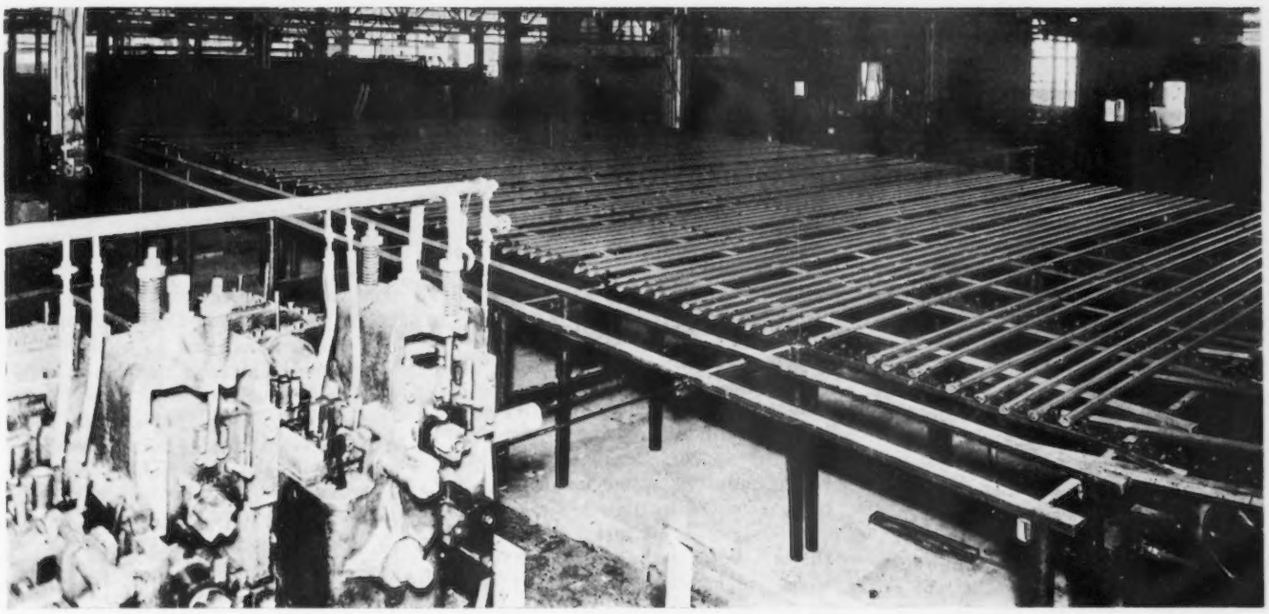


The cooling bed, showing a reducing mill in the foreground.

end of the No. 4 sizing mill. It should be observed that at no point in this layout does the metal retrace its path.

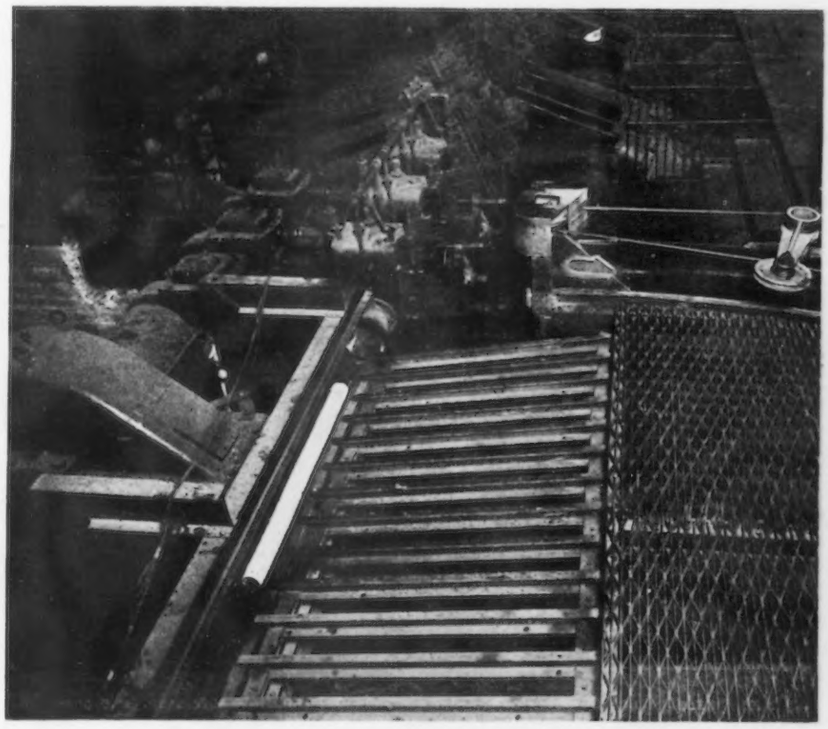
All electric power used on this mill is derived from the local public utility. Alternating current is changed to direct current in motor-generator sets and all mill motors are of the direct current type as manufactured by Allis-Chalmers Mfg. Co.

As previously stated, these motors are staggered in the motor pit. Cool air is taken from a shaft that opens above the roof, passed through filters and blown directly on each commutator. Reduction and drive gears, furnished by the Falk Corporation, as well as shafts, are inclosed in cast-steel housings and all moving parts are under forced lubrication.

All roll speeds are calculated and set by the operator in the control house which stands to one side and above the Foren mill. The coupling of this mill is so close that the necessary instruments on the operator's table occupy almost as long a space as does the mill. On this desk there is an ammeter for the motor which drives each pair of rolls. Each motor also has its speed indicator and two rheostat control levers. It is essential to hold mill motor speeds within 0.20 to 0.30 per cent, that is, 2 or 3 r.p.m. on a 1000-r.p.m. motor. This is accomplished by providing two rheostats for each motor. The first rheostat brings the motor to the approximate speed and then the second one is used to bring the speed within permissible variation.

The necessity for such close regulation is readily appreciated when it is remembered that because of the mandrel no slack or take-up can exist between roll stands. Therefore the rolls must be synchronized to an exceptional degree of accuracy. Cutler-Hammer, Inc., Milwaukee, furnished the control equipment.

Speed and accuracy as well as flexibility are outstanding features of this mill. Such eccentricity as may occur in the piercing unit is eliminated in the Foren mill. Fast working, at proper temperatures, gives uniformly fine grain structure. Elimination of scratches inside the tube means that the user can purchase a lighter wall tube, buy less weight of metal, and at the same time obtain the strength desired. Uncertainty of accuracy of wall dimensions has influenced liberal allowances for eccentricity in most standard specifications. The Foren mill has been patented in the United States and also in several foreign countries by the Globe Steel Tubes Co.



The mandrel is here seen entering the pierced billet. The guide to the squeezing rolls is shown a short distance in front of the billet.

▲ ▲ ▲ Casting the Ford V-Eight

By BURNHAM FINNEY
Detroit Editor, The Iron Age

NO company has shown more courage or met with greater success in attempting the untried than the Ford Motor Co. Almost two years ago it accomplished what many foundrymen regarded as the impossible by casting in one piece its V-eight cylinder block and the upper half of the crankcase plus the exhaust manifold. This procedure has been so perfected and standardized that scrap losses have been reduced to an average of a fraction of one per cent.

Today the Ford company is doing satisfactorily on a production basis what many automotive and steel experts declared could not be done—casting a steel crankshaft for its V-eight cars which is superior in service and longer lived than the forged crankshaft formerly used. Whereas in tests the latter shows measurable wear after 10,000 miles of car operation, the cast shaft shows none (less than 2/10,000 in.).

Weighs 10 lb. Less Than Forged Shaft

Aside from an improvement in the product from the standpoint of serviceability, there are appreciable advantages in manufacturing a cast crankshaft as compared with a forged shaft. It is about 10 lb. lighter than the forged shaft because of the use of cored crankpin journals and the reduction in weight of the corresponding counterbalances. The forged shaft weighed approximately 90 lb. in the rough and 66 lb. when finished, 24 lb. being removed in the machining process. Only 9 lb. of metal is taken off the cast shaft in the machining operations, which now number 54 as against 62 formerly.

As soon as the production of crankshafts by the casting method is standardized as thoroughly as other, longer-used operating practices, a considerable saving in manufacturing cost will be realized.

Analysis of Cast Alloy Steel

The material going into the cast crankshaft may be classified as a high-carbon, high-copper, chrome-silicon steel, since the carbon percentage is considerably under that associated with "irons." The composition of the cast steel is as follows:

Carbon	1.25-1.40
Manganese	0.50-0.60
Silicon	1.90-2.10
Chromium	0.35-0.40
Copper	2.50-2.75
Phosphorus	0.10 max.
Sulphur	0.06 max.

Metal for the castings is being prepared in two 15-ton electric furnaces, the charge consisting of 40 per cent steel scrap and the balance pig iron, back stock and alloys. Gray iron scrap is not employed. From each ladle of metal taken from these furnaces are cast three molds, each of which holds four cast shafts. Each mold consists of 16 dry sand cores stacked on plates and is carried on a conveyor through the core assembly, casting and cooling processes.

Duplexing System to Be Used

A duplexing system for preparing the steel for casting is now being substituted for the two electric furnaces, the capacities of which are inadequate to handle the necessary volume of production. Two 120-in. cupolas with a total capacity of 28 tons of metal per hour (14 tons per hour per cupola) will supply an air furnace of special design with hot metal. The metal will be carried through a trough into the rear of the furnace. The steel will be further refined in the air furnace, which is similar to a small open hearth, for a period of two hours, the bath of the furnace being about six in. in depth.

After the steel is poured, molds move for some distance on an overhead conveyor from which are suspended spe-

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Cores are made on a rotary core-making machine of special design similar to that of a rotary molding, pouring and sand conditioning unit. This is the first time cores have been built on this type of equipment. The vertical core oven is shown in the background.

Cores move along the core assembly line (opposite page) on a continuous storage conveyor which eliminates necessity of a storage room and enables operator to have supply constantly available.

▼ ▼ ▼

Crankshaft ▲ ▲ ▲

USING a high-carbon, high-copper, chrome-silicon steel, Ford is casting crankshafts for its V-eight cars at the Rouge plant, substituting cast shafts for the forged product as standard equipment. This article describes for the first time the manufacture of the cast shafts, including a new method of making cores, a duplexing system for preparing steel for casting, analysis of the steel, heat treatment of the castings and machining problems.

cial carriers. When the molds have had time to cool slowly, the sand is knocked off and falls into a pit, from which it begins its journey through a reconditioning system. The castings themselves remain on the conveyor and are transported to the mezzanine floor, where the gates are removed with a sledge hammer and chisel, in an ingenious manner which assures minimum of shock to the casting, and the individual castings hung on conveyors for inspection prior to heat treatment.

Casting Weighs 420 Lb.

The entire casting of four crankshafts, together with gates and risers, weighs from 420 to 425 lb.

Cores are made on a rotary core-making machine of special design similar to that of a rotary molding, pouring and sand conditioning unit. This is the first time that cores have ever been built on this type of equipment. The machine occupies a very small space and turns out 3200 pieces per eight-hr. day (200 sets of four crankshafts). Another machine of the same capacity will shortly be put into service.

Operators transfer the cores by hand from the core-making machine to two vertical core ovens of the continuous type, where they are baked for one hr. 20 min. There are 38 hangers in each oven, and 12 cores are carried on each hanger. Core plates are hung on a conveyor which takes them through a washing machine and back to the core-making machine.

Core Conveyor Eliminates Storage Room

After being baked, cores are placed on a flat-type carrier on a chain conveyor, moving through inspection, leveling where necessary, and a silica wash. Two of the cores, numbers four and five in the stacked series, are sprayed. After another inspection, cores are placed by hand on racks on a continuous storage conveyor running along the core assembly line. This conveyor eliminates the necessity of having a storage room for cores with the consequent handling expense. It enables operators along the assembly line to have available constantly at their elbow a supply of the various cores going into the crankshaft molds.

Before the header core is put in position on top of the stack of cores, sheets of paper are laid over the sprues to prevent the entrance of loose sand. The series of cores is gated in between the sixth and seventh cores, giving a bottom gate effect.

From the foundry the cast crankshafts are carried on overhead conveyors to the crankshaft machining department, where they are heat treated before being machined. To make them more machinable, to remove stresses and strains set up in the casting process, to refine the grain and to strengthen the shaft, they pass through a normalizing furnace in which they are heated to 1650 deg. F. for 20 min. and cooled to 1000 deg., the entire cycle taking 1½ hr. Without being quenched, they are heated in a second furnace to 1400 deg. for 9 min. and cooled to about 700 deg. This second cycle occupies two hr. They then are air cooled to normal temperature.

Each Ladle of Steel Checked

If these factors are watched closely, the shafts will remain straight through the normalizing treatment and the Brinell hardness, and physical properties will be within the proper limits. Incidentally, each ladle of steel is checked for correctness of pouring temperature by optical pyrometer just before being poured.

In the operation of centering the cast shaft before it is machined, attention is given to centering to the unmachined mass of the shaft so that the balance can be controlled and corrections made for balancing at the proper points after the shafts are finish machined.

Because of the difficulty in machining this unusual material, special hammered high-speed steels are being employed with satisfactory results.

Work Speeds of Tools Decreased

Work speeds of machine tools have been cut down, but feeds have generally remained the same in machining the cast shaft as compared with the forged product. Lathe speeds have

and keyway milling machine, the spindle speed has been cut in half and the work feed continued at 0.002 in. The operator brushes out the chips every 3/16 in. to 1/4 in. A standard cutting emulsion is being utilized as a coolant for the tools.

Grinding operations are no more in number on the cast shaft than on the forged shaft. Grinding wheels one grade softer than those used on the forged shaft and of the same grain give the best results. Wheel speeds and work feeds have not been changed. The cast shafts have an unusually hard and lustrous finish after being ground.

Shafts Given Torque Test

Following rough machining, all shafts are given a torque test. After being finish machined, they are given a reverse torsional test in a machine specially designed for this purpose. A torque of 45,000 in.-lb. is applied in both directions, this load being 10 times the calculated maximum stress occurring in service and being close to the elastic limit of a forging of the same design.

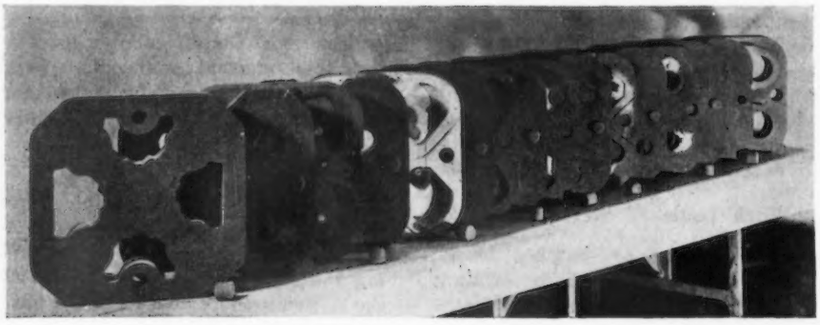
In fact, although it has about the same modulus of elasticity as the forged shaft, the cast shaft is capable of withstanding repeated reverse stresses for more than twice the time. For this test the crankshaft is mounted in a machine on bearings corresponding to the main bearings of an engine in which the center bearing is out of alinement 1/32 in. The shaft then is revolved at a standard speed of 1200 r.p.m. until it shows signs of failure, whereas the forged shaft begins to show failure in about half the time. The cast shaft does not show indication of fatigue failure within from 60 to 90 min.

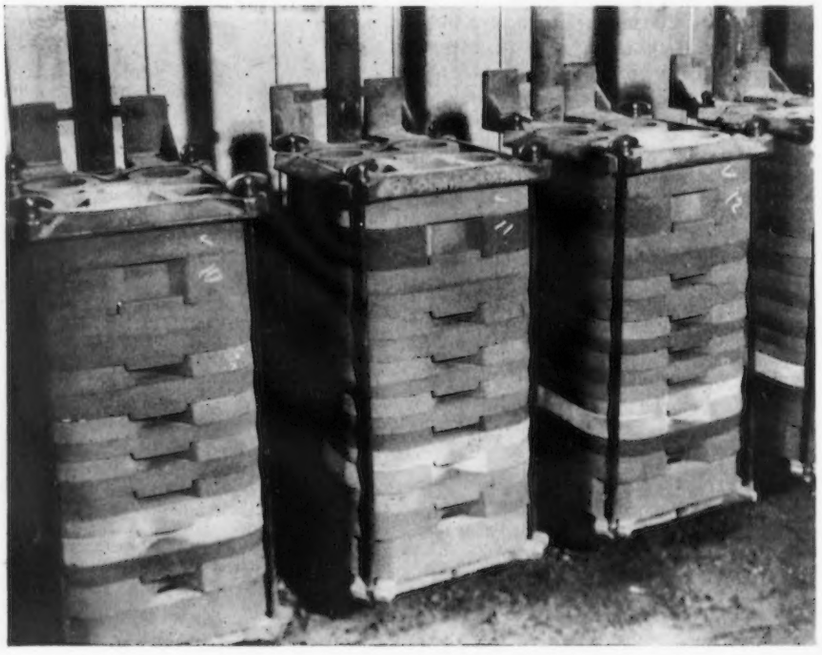
Brinell Hardness Averages 302

Brinell tests reveal that the exceptional fatigue strength of the cast crankshafts may be attributed to the uniform hardness of the metal from the heart of the core to the surface. This is not true of the forged shafts, which show a Brinell hardness of only 170 at the center and as high as 444 at the surface. Before heat treatment the Brinell reading of the cast shaft is 340 to 360 and when finished from 286 to 321, with the average hardness around 302.

At the present time approximately 1800 passenger cars a day are being equipped with the new cast crankshafts, the remainder of the daily output being fitted with forged shafts. However, within a few weeks it is expected that production facilities of the Ford foundry will be enlarged to the point where all shafts going into Ford cars will be of cast alloy steel.

Foundry scrap losses in the casting process have already been reduced to





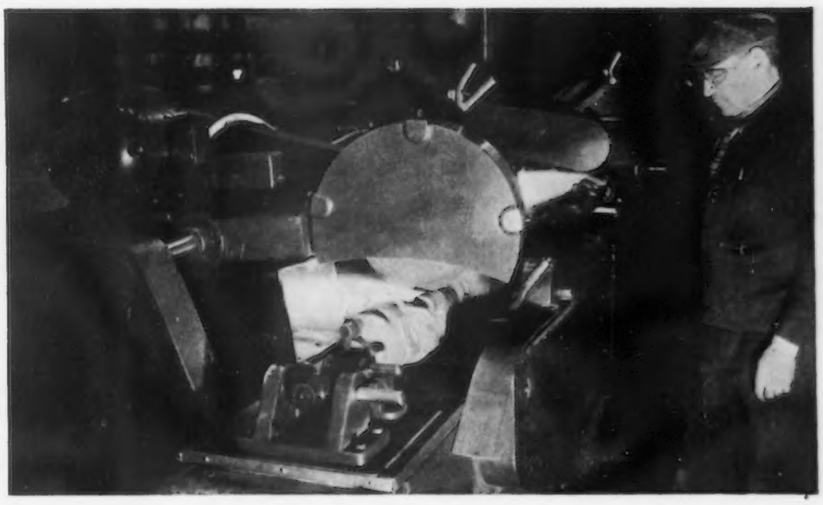
(Upper left): Casting, together with gates and risers, before shafts are knocked apart.

(Above): The 16 dry sand cores which make up a mold are shown.

(At right): Molds, each of which consists of 16 cores stacked on plates, are carried on a conveyor through core assembly, casting and cooling processes. Before the header core is put in place, sheets of paper are laid over the sprues to prevent entrance of loose sand.

been decreased about 55 per cent and spindle speeds on drills, reamers and tappers 35 to 40 per cent. The cutting tool is fed into the work as heavily as possible without chatter or breakage, due to the fact that a light feed causes the tool to glaze quickly and dull. An important rule is to keep the cutting edges of the tool well under the surface of the work.

In connection with the drilling of the oil hole on a combination drilling



New grinding operations, one with a portable machine, have been introduced at the Rouge plant in connection with the manufacture of the cast crankshaft.

2 per cent, but are almost certain to decline to a figure comparable with the inconsequential losses on the V-eight cylinder block as soon as operations are further standardized.

The cast alloy steel going into the crankshaft and the methods of casting the shaft have been developed by the Ford organization over a period of more than five years. For at least two years about 2000 Ford cars equipped with cast crankshafts have been in constant service. None of these has failed due to distortion or abnormal wear and none has shown defect from fiber stress usually associated with ferrous metal subjected to repeated reverse stresses. Thus abundant data are at hand concerning the most satisfactory analysis and casting procedure.

Contrary to reports published elsewhere that cast crankshafts are being made for the Ford company by outside suppliers, all shafts are being cast in the Ford foundry at the River Rouge plant at Dearborn, Mich.

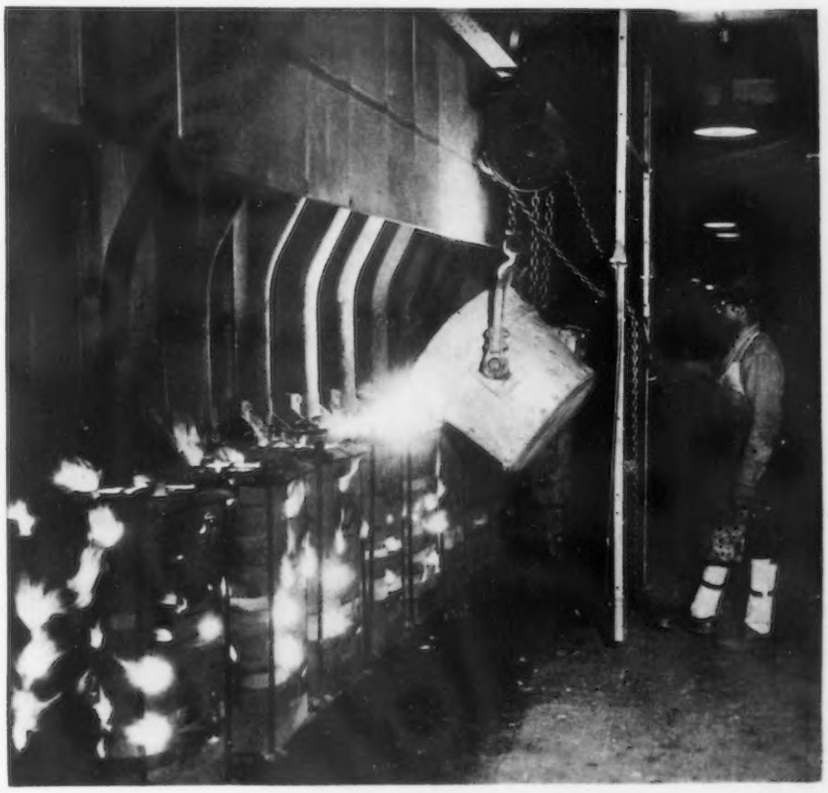
Navy Department To Buy Steel

WASHINGTON, March 13.—The Bureau of Supplies and Accounts, Navy Department, will open bids March 20, on approximately 2800 tons of galvanized and 1900 tons of black plates for seven coast guard cutters to be built at the Brooklyn, Philadelphia and Charleston, S. C., navy yards. They will also require about 200 tons of black and 150 tons of galvanized steel bars for which bids will be received.

The Bureau will also take bids on that day for 226 tons of plates and 44 tons of shapes for the Norfolk, Va., navy yard.

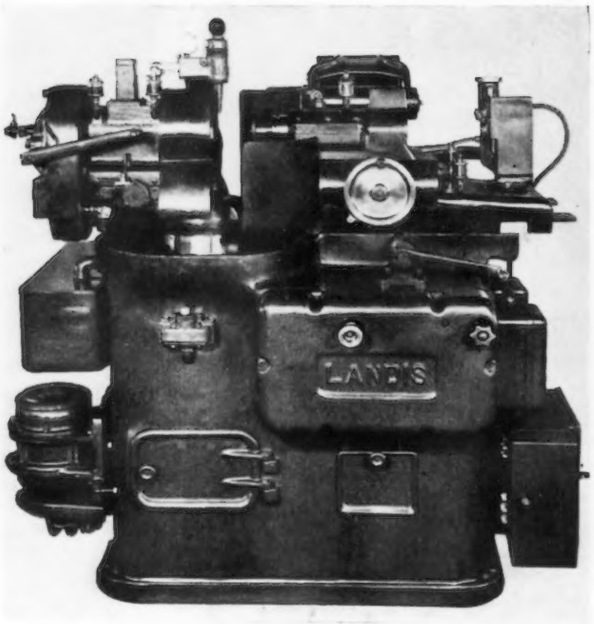
On March 16 it will open bids for two box and three flat cars for the ammunition depot at Mare Island, Cal. On March 27 bids will be received for 52 tons of steel wool for various navy yards.

Spark-ignition fuel-oil engines will be discussed at a meeting of the Metropolitan section of the Society of Automotive Engineers, to be held March 15 at the Roger Smith, 40 East Forty-first Street, New York. Marine reduction gears will be the major topic of another meeting of the section, to be held March 29 at the same place. Each meeting will be preceded at 6:30 p. m. by an informal dinner.



Three molds, each holding four crankshafts, are poured from each ladle of metal.

Hydraulic Internal Race Grinder Has Automatic Air-Sizing Device



Both wheel feed and head oscillation are hydraulically actuated. Motors are mounted low to eliminate vibration.

AUTOMATIC air sizing, hydraulic wheel feed and head oscillation and heavier construction, particularly of the wheel-head, are features of the new 3½-in. hydraulic internal race grinder brought out by the Landis Tool Co., Waynesboro, Pa. Another improvement as compared with the company's previous race grinders is the method of driving the grinding wheel.

The standard machine has capacity to grind all the smaller sizes up to and including the 212,311 and 409 groups. It can be used for single-row races and also for double-row and thrust races within the same size range. Larger races may be handled by removing the sizing device and certain other units and operating it as a hand machine.

When grinding the machine operates automatically, the automatic operation being controlled from the progress of the grinding by the Landis air-sizing device. The operator places a ring in the chuck and traverses the grinding wheel into the work. As soon as the wheel reaches grinding position the work starts rotating, the head starts oscillating and the wheel automatically rapid feeds into grinding contact with the race. The hydraulic feed mechanism then feeds the wheel at a predetermined roughing rate.

When the work is rough ground to within about a thousandth of finish size, which amount is adjustable, the feed is reduced automatically to a very fine finishing rate if desired, the coolant may be cut off automatically at this point for dry finishing. As soon as the race reaches finish size the wheel backs away and oscillation stops. The operator then traverses the wheel out of the race, removes the sizing device and reloads. It is stated that raceways within less than 0.001 in. may be consistently produced.

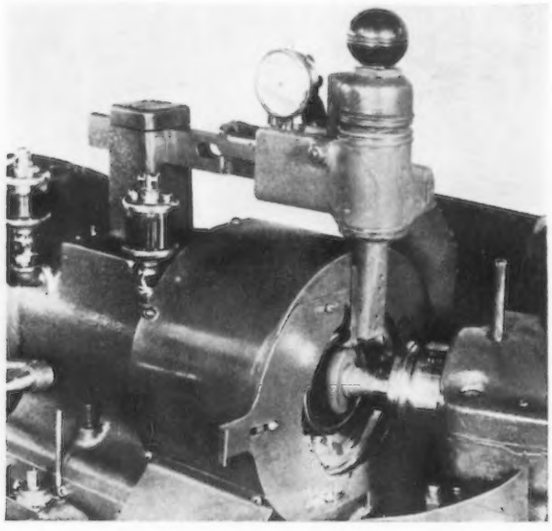
Chatter-free finish is attributed to the use of hydraulic power and the elimination of vibration between the grinding wheel and the work by mounting both electric motors low on the bed. The rear drive motor, of 3 hp., is coupled directly to the oil and coolant pumps and is belted to the wheel-drive jackshaft. This jackshaft and all idlers are mounted in the bed so that the vibration will not be transmitted to the wheel base. Only one moving part, the wheel-spindle, is on the wheel base.

The oscillating head is mounted on two large, heavily preloaded ball bearings, and is oscillated by a vane-type hydraulic motor in which all impulses are balanced. The head is graduated in degrees and may be set to oscillate an equal amount either side of center, or the correct amount either side for non-symmetrical races. The whole hydraulic motor and head is turned 90 deg. for grinding thrust races.

The workhead is driven by a ¾-hp. vertical motor on the left-hand end of the bed. The power is transmitted through a V-belt, a vertical shaft, a worm and a horizontal shaft. The latter carries a flat belt pulley which drives the workhead spindle. Change of work speed is made by changing the pulleys and belts. Mounted on adjustable bronze bearings, the workhead spindle is the only rotating shaft in the machine not having ball bearings.

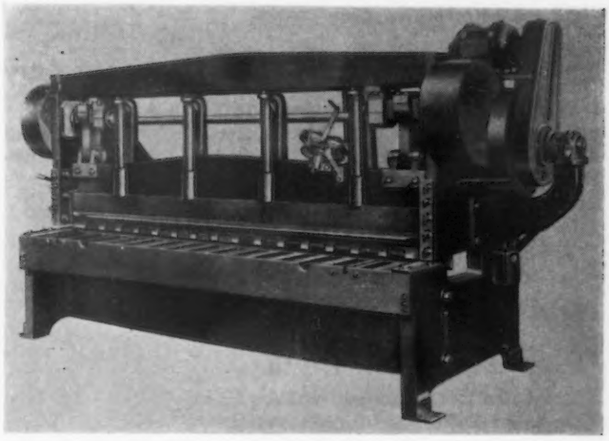
Operation of the air-sizing device was described at length in THE IRON AGE of Oct. 26, 1933. A diamond-tipped finger rides lightly on the raceway during the grinding. It has up-and-down movement under spring tension. Once set the device requires no attention unless the size of the race being ground is changed. A dial gage at the top of the device indicates visually the progress of the grinding cycle.

Specifications include: Maximum size of bearing races (pitch diameter), 3¾ in.; maximum distance, work center to oscillation center, 1⅞ in.; swing inside of waterguard, 8 in.; swing with waterguard and sizing device removed, 10 in.; standard work speeds, 200, 400 and 600 r.p.m.; wheel spindle, Ex-Cell-O, and wheel spindle speeds, 12,500, 15,000 and 18,000 r.p.m. The machine occupies floor space of 45 x 60 in. and its net weight, without electric motors, is 3080 lb.



The automatic air-sizing device, an outstanding feature of the new race grinder, is here shown in the operative position.

Shear with Back Gage Operated from Front



Time is saved by eliminating the necessity for walking to the rear of the machine to set the gage.

AN all-steel power shear with the back gage operated from the front of the machine, has been brought out by the Dreis & Krump Mfg. Co., Seventy-fourth Street and Loomis Boulevard, Chicago. Operation of the gage from the front is emphasized as saving considerable time, inasmuch as the operator is not required to walk to the back of the machine each time he wants to set the gage.

The illustration shows the operating crank of the gage and the dial, which is graduated in inches and sixty-fourths. Dial graduations are double scale so that readings may be easily and quickly made. Both screws are operated in unison, keeping the gage in parallel alinement with the knife at any position. The gage locks automatically at any setting, and the gage screws can be disconnected for taper cutting.

Other features claimed to assure accurate cutting include low cutting angle of the upper blade, high-pressure hold-down and rigid, all-steel plate construction. The one-piece hold-down straightens out any buckles or unevenness in the sheet before the shearing is started, thus adding to the accuracy of the cut. Individual hold-down fingers can be supplied if desired.

Waldron All-Steel Torque Ring Coupling

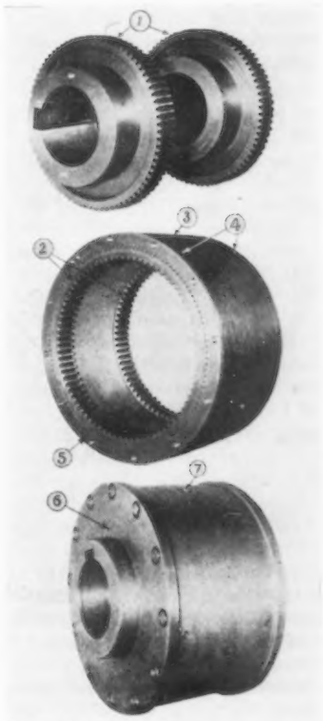
QUADRUPLE engagement is a feature of the Waldron torque ring coupling illustrated, which has been developed by Smith & Serrell, general sales agents, 62-A Washington Street, Newark, N. J., and the John Waldron Corpn., New Brunswick, N. J., makers of the Francke flexible coupling and of wall paper and other special machinery.

Major parts of this gear-type coupling are the hubs, torque gears, cover sleeve, and end plates. There are four points at which movements can freely take place when connected shafts become misalined. Each torque ring, *2*, can tilt and can slide endwise with respect to its hub member, *1*, and the torque rings and hubs can also tilt and can move endwise within the cover sleeve.

Heavily-loaded bolted or flanged connections have been eliminated in this design. The torque is carried from hub to hub by lubricated surfaces through solid steel parts. The end plates, *6*, and gaskets complete the coupling enclosure which contains oil in sufficient quantity for long periods of operation.

The hubs are alike and the toothed flange of each is at the center, so that either hub may be turned end for end to obtain new driving surfaces in case the original teeth faces become worn from neglected lubrication.

The torque rings, from which the coupling derives its name, have teeth cut on the inside and outside. They are loosely held in place within the cover sleeve, and the rings and cover sleeve are handled as a single unit. By removing either endplate the cover sleeve and torque rings can be moved in the opposite direction to line up the connected shafts initially or to check their alinement subsequently from the faces of the inner hubs.



Torque is carried from hub to hub of the coupling by the lubricated surfaces of solid metal parts.

Strength and durability under conditions of heavy load, heavy misalinements, shock and vibration, such as frequently are encountered on direct-connected heavy-duty geared motor and engine drives, are claimed. Fifteen sizes, for shafts ranging from 1⅞ to 12 in. in diameter and with ratings from 22½ to 4840 hp. per 100 r.p.m., are made.

Installs 25-Lb. Laboratory Electric Furnace

THE Pittsburgh Lectromelt Furnace Corpn., Pittsburgh, has installed one of its 25-lb. laboratory furnaces, a new size, at the plant of the Burgess-Parr Co., Moline, Ill., manufacturer of calorimeters, valves, crucibles and heavy-duty castings. The furnace will be operated from the substation of a 125 lb. per hour single-phase Lectromelt furnace used for the production of illium, a non-ferrous alloy that is corrosion resistant, strong and tough and has a practically negligible coefficient of expansion.

New Hard Surfacing Electrode

FOR building up steel surfaces of all types, except austenitic, the Lincoln Electric Co., Cleveland, has brought out a new shielded arc electrode designated as the "Wearweld." This electrode is said to deposit an air hardening alloy steel of unusual hardness and toughness, the hardness depending somewhat upon the composition of the base metal. A single layer on mild steel has a Rockwell C hardness of 40 to 45, and additional layers have a hardness of 48 to 52. On 0.70 carbon steel, a single layer is said to

have a Rockwell C hardness of 50 to 55.

The heavy coating of this electrode provides a shielded arc that permits transfer of the molten metal under non-oxidizing conditions. It also provides a layer of slag which further protects the metal from the air and causes the weld metal to solidify in a smooth, uniform bead. Good deposits may be made in thin layers.

New Gasket-Type Drop Forged Pipe Coupling

THE Champion Machine & Forging Co., Cleveland, has brought out the "Positive Seal" pipe coupling illustrated, which is designed to permit joining of straight, plain-end pipe as it comes from the mill—without grooving, threading, beveling or upsetting the ends. High strength in tension, effective sealing at pressures up to 4000 lb. per sq. in., and ease of assembly, even by unskilled labor, are claimed. Sizes for pipe ranging from 2 to 8 in. in diameter are made.

The coupling consists of five parts, namely, two half coupling sections that contain gripping devices, one

Straight, plain pipe may be joined quickly as it comes from the mill.

gasket with metal-protected sections, and two bolts. The gripping rings are drop forged and heat treated, and are so assembled in the half couplings that they become integral with the coupling and cannot be lost.

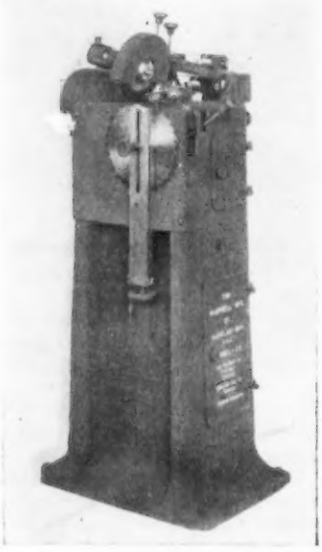
Gaskets, made of rubber, are designed to provide a double seal which is equally effective against either pressure or vacuum. Two steel reinforcements 180 deg. apart protect the gasket from the pinching action of the two halves of the coupling when being assembled on the pipe. These reinforcements are provided with a locating clip to facilitate positioning.

It is stated that these joints can be broken down and made up again any number of times either on the same or new pipe, without impairing the efficiency of the coupling.

Link-Belt Co. and subsidiaries report for the year ending Dec. 31, 1933, net profit of $258,644 after depreciation and Federal taxes, compared with a net loss of $970,120 in 1932. A charge of $889,115 was made against surplus to adjust securities owned to market value.

Circular Saws Accurately Resharpened

ACCURACY, simplicity of operation and rapid adjustment are features of a new fully-automatic pedestal-type saw grinder offered by the Wardwell Mfg. Co., 3167 Fulton Road,



Wardwell automatic circular saw grinder.

Cleveland, for the grinding of circular wood and metal saws. This machine does not depend upon the shape of the edge of the grinding wheel to form the shape of the tooth, and it is claimed that the teeth of milling, slitting, screw-slotting and small cold saws may be resharpened so that all teeth are alike within 0.0005 in.

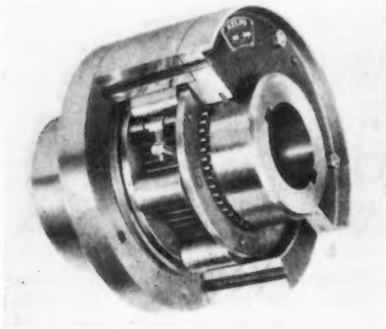
Three rates of feed, for grinding 30 to 75 teeth per min., provide for grinding a range of tooth sizes from large to small. Double pawl fingers, one on each side of the grinding wheel, assure continuous advance of the saw even where teeth are broken or filled with metal. Of yoke-type construction, the grinding wheel head is supported by two adjustable hardened steel pivots with radial adjustment for any hook of tooth desired. The grinding cam spindle is mounted on grease-sealed ball bearings. The grinding wheel has two speeds so that when it becomes worn down to a smaller diameter its speed may be stepped up, and in sharpening high-speed steel and carbon steel saws, suitable speeds for each are available. The spindle belt runs over an idler and the belt tension load on the spindle bearings is maintained uniformly by adjustable spring tension on the idler arm. Freedom of the grinding wheel head from vibration and the elimination of slides which wear are other features emphasized.

One universal cam permits following any shape of tooth with the grinding wheel, whether straight or curved back. Through an adjustment in the eccentric the proper speed may be obtained quickly for saws with large or small teeth. After regrinding, a land or flat may be put on each tooth to the amount required.

The grinder has a rigid one-piece cabinet frame with removable front plate, and all parts and adjustments are accessible through a door at the side. The speed of the ½-hp., driving motor is 1750 r.p.m. and that of the driveshaft, 1000 r.p.m. The grinding wheel is 8 in. in diameter. The machine may also be supplied in the bench type as a combination grinder for circular, band and hack saws.

Clutch Is Free-Wheeling In One Direction

THE Morse-Kelpo clutch, a positively actuated one-way clutch, free-wheeling in one direction but driving in the other, is being offered for industrial use by the Morse Chain Co., Ithaca, N. Y., a division of the Borg-Warner Corpn. Operating with no back-lash, it is said to be highly suitable as a ratchet drive. Used to connect two prime movers to a common load, either will pull the load but neither can drive



The dual drive has many applications.

the other. This dual drive finds application for two motors or motor and turbine driving force or induced draft fans, for auxiliary stand-by drive, and for booster drives for starting heavy machines, such as steel and paper mill machinery and printing presses. Simple design and rugged construction are emphasized. Parts are of alloy steels, hardened and ground to close limits of accuracy, and a feature is automatic compensation for wear.

A NEW method for the production of certain types of non-ferrous castings is advocated by a large Cleveland foundry. Match plate and pattern castings are made under pressure in a composition mold.

It is claimed that this method results in the elimination of shrinkage at the match plate line. Because the metal follows closely the details of the mold, a more accurate casting is produced.

Materials Engineers Revise Standard For Materials for the Industries

SPECIFICATION writing in the field of engineering materials went on apace in the week of March 5 at Washington when many of the committees of the American Society for Testing Materials met simultaneously, as has latterly been the custom, in its procedure of crystallizing the views of producer and user, who make up the committees. There were some 155 meetings and a total attendance of about 600. Besides the conferences, a symposium was staged on the outdoor weathering of metals and metallic coatings, and an evening was given over to an illustrated lecture on the Hoover or Boulder dam and a general dinner was arranged with speakers informed about current activities of the Government in the realm of business. The recommendations of the several committees will come before the society in its annual meeting at Atlantic City in the week of June 25.

Progress in the development of steel specifications, as indicated in the reports of the several subcommittees of Committee A-1 on Steel, is outlined in the subjoined report of leading recommendations of these committees. Incidentally, the officers of A-1 were reelected for the two-year term as follows: Chairman, H. H. Morgan, Robert W. Hunt Co., Chicago; vice-chairmen, E. F. Kenney, Bethlehem Steel Co., and H. W. Faus, New York Central Lines; secretary, H. P. Bigler, Rail Steel Bar Association, Chicago.

Raises Sulphur Limit of Rivets

A special committee which had been appointed to study the possibility of consolidating all rivet specifications found it desirable to retain for the present the stipulations in three different steel specifications. These set up as the tensile requirements the following ranges: for boiler rivets, 45,000 to 55,000 lb. per sq. in.; for bridges, buildings and rolling stock, 52,000 to 62,000 lb., and for ship rivets, 55,000 to 65,000 lb. The subcommittees separately concerned reported, however, agreement in respect to the three classes of rivets that the limiting sulphur content be raised from 0.045 to 0.05 per cent.

The committee on steel rails and accessories suggested the advisability of publishing a pamphlet containing among other things the specifications for splice bars, tie plates and the like, for the convenience of the purchaser.

The committee on structural steel recommended that the tentative standards for steel for bridges, for buildings and for mild steel plates be advanced to standard.

In the field of steel reinforcement bars a proposed tentative revision further tightens up the permissible weight variations in that it provides tolerances on individual bars of 6 per cent under for bars ⅜ in. and over; 10 per cent under for bars less than ⅜ in. in diameter. When approved this, it is believed, will be consistent with the allowable "lot" variations now given as 3½ per cent over or under the theoretical weight for bars ⅜ in. and over in diameter; 5 per cent over or under for bars under ⅜ in. in diameter. The tentative revisions in the cold-drawn steel wire reinforcement specifications, which were drafted last year to provide yield point requirements and the clarification of permissible variations, are to be referred to letter ballot of the entire committee for recommended adoption as standard.

The committee on steel forgings and billets, R. W. Steigerwalt, Carnegie Steel Co., reelected chairman, brought in a revision on the specification for carbon-steel car and tender axles to take care of axles with parallel sides and to allow for a manganese range of 0.40 to 0.90 per cent, instead of an upper limit at present of 0.70 per cent, the last-mentioned change to bring the standard into harmony with other forging steel specifications. Testing requirements will be eased up when an order is for less than 15 tons. A special committee is to study the inclusion of chemical requirements in the present tentative specifications for normalized and tempered alloy-steel forgings for locomotives.

Four Pipe Specifications to Go Standard

T. G. Stitt, Pittsburgh Steel Co., will head the subcommittee on steel tubing and pipe. The committee expressed regret it could present no specification for carbon steel still tubes. It asked for a revision of the tentative specification for fusion electric-fusion-welded steel pipe in respect to the projection of the weld metal. The allowance in the present tentative recommendation is that the projection shall not be more than 30 per cent for pipe ⅜ in. in thickness and 25 per cent for pipe over that thickness. The new note would limit the projection for metal 3/16 in. thick to 50 per cent, from that gage to and including ⅜ in., to 30 per cent and over ⅜ in., to 25 per cent.

Existing tentative specifications for electric-resistance-welded, forge-welded, lock-bar and riveted pipe were all approved for passing to standard, but those for electric-fusion-welded pipe, one for pipes 30 in. and over and the other for those under 30 in., were retained as tentative standards.

In the tentative specifications for cold-rolled strip steel, the recommendation is for the removal from the body of the specifications the tabulation of the physical properties and the placing of this as an appendix in amplified form. A. L. Davis, Scovill Mfg. Co., was reelected chairman of the subcommittee on sheet steel.

A tentative standard is expected to be available for the June meeting of the society on filler metal for fusion welding. N. L. Mochel, Westinghouse Electric & Mfg. Co., was elected chairman of the subcommittee on steel for welding, succeeding Dr. F. N. Speller.

Steel for High Temperature Service

The committee on valves, fittings, piping and flanges for high-temperature service, Col. A. E. White, chairman, decided on an early tabulation of the available information on creep data, all with the plan to present such information as an appendix to the specifications for the materials. The present attitude is that the specifications should provide for buying on chemical composition and on physical characteristics determined at room temperature, while the addendum to the specifications would supply information as fully as possible regarding the creep properties of different classes of steels.

A special committee is to meet shortly with a committee from the joint high-temperature research committee to compile the tabulation and it would welcome information from any laboratory that has been making tests under high temperature conditions. A list of laboratories equipped for making high-temperature tests is desired, and arrangements are being made to ask as many laboratories as will do so to conduct a single short-time creep test, all on the same character of material and under the same conditions, and all with the idea of correlating results among the laboratories when running tests under the code of the society.

The material will be supplied through P. E. McKinney, Bethlehem Steel Co., and will probably be a 0.40 per cent carbon steel, annealed to produce a fine grain and with special care to guarantee that test samples will be uniform. The plan is for a single test under a load of, say, 10,000 lb. per sq. in., at 900 deg. F., for 500 hr. or perhaps for 1000 hr. The temperature selected is regarded as above the strain hardening range and under the rapid oxidation condition.

New specifications for electric-fusion-welded steel pipe for high-temperature and high-pressure service were approved by the committee for submission to the society. They cover pipe 18 in. in diameter and over. Supplementary requirements of an optional nature are provided for pipe intended for use in central stations having steam service pressures of 400 lb. per sq. in. or over and temperatures up to 850 deg. Three grades of

plate for use in making the pipe are given, minimum tensile strengths being 45,000 and 55,000 lb. per sq. in. Radiographic examinations of the pipe are required. Each length of pipe is to be tested to a hydrostatic pressure which represents a stress of 75 per cent of the minimum specified yield point. Other changes recommended include the omission of requirements for flanges for forge welding, Class A, from the standard specifications for forged or rolled steel pipe flanges for high-temperature service (A 105-33). The standard, covering alloy-steel bolting material for high-temperature service, will be changed by the exclusion of nuts made from hexagonal-bar stock.

An interesting discussion on the steel code, participated in by a number of representatives of leading manufacturers and consumers, featured a part of the main meeting of the Committee A-1. It was pointed out that A.S.T.M. specifications covering a number of materials and products are a fundamental part of the iron and steel code, and in many instances are the foundation for basic prices.

Test Bars for Iron Castings

IN the meetings on cast iron (Committee A-3), it was brought out that rather widespread attention is being paid to the making of test bars, for tension and transverse tests, and for impact tests. Reports on all the special tests that have been under way were not available at the time of the meeting but indications are that the so-called optional method (which provides for making tension test specimens by machining from the transverse test bars) is preferable to the regular stipulation, which is that the bars shall both be separately cast.

An extended investigation has been taken up by Dr. J. T. MacKenzie, American Cast Iron Pipe Co., for drop impact tests. To any one interested he will send the drawings of the apparatus recommended, with the hope that many will pursue the drop testing studies. The drawings will indicate the hammer size and shape and the span, all looking to establishing a standard test of the kind.

Reports were numerous of the high regard in which the symposium of cast iron held last June in Chicago is regarded. The results of this compilation were recently published jointly by the American Foundrymen's Association and the American Society for Testing Materials. The complete text-book nature of the compilation appears to be universally termed the last word on the place of cast iron in the engineering industries, rendering previous publications obsolete. The effort will be to get the 164-page pamphlet into the hands of designers as well as of foundrymen.

The committee on cast iron voted to participate in a joint A.F.A.-A.S.T.M. session on testing of cast iron to be held at the International Foundry Congress at Philadelphia next October. Papers will be submitted by one of the subcommittees of A-3 and by individual members of the committee. These papers will cover original work.

Government Activities Discussed

DISCUSSION of current governmental activities in business featured an informal general dinner held on March 7. The speakers were Capt. C. A. Jones, head of the design division, Bureau of Engineering, Navy Department; Dr. Robert A. Brady, special adviser on consumers' standards, NRA, and assistant professor of economics, University of California, and Col. Henry M. Waite, deputy administrator, Federal Emergency Administratiton of Public Works. Col. Willard T. Chevalier, publishing director, *Engineering News-Record*, established a high standard as toastmaster.

Captain Jones took the opportunity to relate the help given to technology by the Navy, in particular with its contributions to the recent classic studies of the influence of sulphur and phosphorus in steel and their determination and its two-year investigations of creep values. The Navy's technicians, he explained, are handicapped by the small appropriations available for providing attendance on engineering meetings, an amount of the order of $1,500, which is likely to disappear whenever the Navy undertakes to witness an eclipse of the sun.

Doctor Brady indicated in no uncertain terms a belief that consumers should be represented in the writing of standards in connection with the codes of fair competition and that each stratum or stage of the business structure should write the specifications for the supplying stage. He looks for the appointment shortly of committees to have a voice in the establishment of standards, with government representation as well. Consumer groups are being set up on a county basis, with some 200 of them now in existence. He envisions the use of high schools and presumably of high-school pupils to make chemical and physical tests under code standards.

Colonel Waite considers that the PWA is building up in the country increased knowledge of engineering standards and of accounting and planning. Latterly, he said, projects that were offered for Federal support were showing better planning and sounder underlying economic reasons for being than was formerly the case.

Ingersoll-Rand Acquires G. E. Turbo-Blower Business

INGERSOLL-RAND CO. has acquired the turbo-blower business of General Electric Co. and will consolidate it with its own turbo-blower department.

This acquisition places Ingersoll-Rand in position to meet demands for blowers and centrifugal type compressors for the broadest possible variety of uses.

Ingersoll-Rand is a long-established manufacturer of blowers of medium and large capacities, for pressures ranging up to 100 lb. General Electric has specialized in both single and multi-stage units for a variety of services in low and medium pressures. Ingersoll-Rand also secures an exclusive license under the various General Electric patents.

This complete line of blowers now offered by Ingersoll-Rand includes low pressure units for aeration of sewage, ventilating and air conditioning systems, blowing cupolas, atomizing oil for furnaces, furnishing agitation air for flotation work, and for raw water ice systems, operation of pneumatic conveying systems, and developing pressures and vacuums in handling manufactured gas.

The medium-pressure machines cover the complete field for blast furnace and converter blowing and for gas booster work.

The manufacturing equipment previously employed by General Electric is being moved to Ingersoll-Rand's Phillipsburg, N. J., plant, where all types and sizes will be manufactured. Sales activities will be directed from Ingersoll-Rand Co.'s general offices at 11 Broadway, New York.

Specifications on cast copper and copper alloys are to be reviewed by a committee of the American Society for Testing Material to look into necessary and desirable revisions. It is planned to emphasize the physical properties of these materials and to use the chemistry more as a guide, depending on the use and application of the material. The specifications for bronze bearing metals for turntables and movable railroad bridges may also be reviewed, these in cooperation with the American Railway Association and the American Association of State Highway Officials.

The operating rate of the steel industry for the week beginning March 12 was 46.2 per cent as compared with 47.7 per cent last week, according to the American Iron and Steel Institute.

Steel Price Policy Under Code Protects Small Enterprises

By WALTER S. TOWER
Executive Secretary,
American Iron and Steel Institute

IN an address at the Raleigh Hotel, Washington, March 7, before NRA Group Conference V, on Small Enterprises, Mr. Tower stated that the decision of the steel industry to avoid granting quantity differentials was prompted by Section 3A of the Industrial Recovery Act, which bans practices that would encourage monopolies or oppress small industries.

He stated that the large user of steel is supposed in theory to have an advantage in its scale of operations and does not need the additional advantage of preferential prices in order to live. The cumulative effect of preferential price treatment would be to make the large consumer still larger and the small purchaser still smaller.

The single-price policy of the steel industry has ample precedent in railroad rates, which are the same whether a shipper moves a carload or several thousand cars, and in postage, which is at the same rate whether a person ships one package by parcel post or thousands of packages.

THE question of quantity differentials or quantity discounts, whichever way you may choose to think of the subject, is a matter which in the drafting of the steel code was discussed at considerable length. Prior to the code or the drafting of the code, there were many variable practices in the steel industry with respect to pricing of different products for different purchasers. Generally speaking, I believe, it was true that the large purchaser could get a different price from that which was quoted to the small purchaser. It probably is equally true that the purchaser of a given quantity didn't always get the same price as quoted to another purchaser of a like quantity. I mean by that statement that probably there was not any uniform classification such as has been practised, I believe, in some industries in respect to purchasers in the granting of quantity differentials or discounts.

You probably are all familiar with the fact that in respect to differentials of this sort the procedure in one industry may be to grant differentials on what may be called a functional basis; I mean that a jobber may receive one discount or differential, a wholesaler—if you distinguish between a wholesaler and a jobber—a second differential, and the retail dealer still a different discount. The other system, which has been relatively common, is that of basing discounts entirely on quantities, either one of two ways—either the quantity purchased at a given time or the quantity purchased over a period of time, the period of time varying widely. So far as I am familiar with the situation in the steel industry neither one of those policies has been followed either consistently or regularly; there have been at times combinations of both but neither one could have been said to be uniformly characteristic of the steel industry.

The question of differentials or discounts was discussed rather extensively at the time the code was being framed and the general conclusion reached by members of the industry who were active in discussing the various provisions that were to go into the code was to the effect that there should not be quantity discounts or differentials. The chief reason for that appears to have been the provision in the National Industrial Recovery Act in Section 3 A, I believe, to the effect that codes are not to be designed to promote monopolies or to eliminate or oppress small enterprises. I believe also that this question of quantity differentials and discounts in connection with that provision of the National Industrial Recovery Act was discussed informally with representatives of the National Recovery Administration and that the idea of granting or providing for no quantity differentials or discounts in the Steel Code met with the approval of those representatives of the Administration with whom the subject was discussed.

Precedent in Clayton Act Debates

If you go back you will find a relatively early presentation of this same idea, which I believe was behind the provision of the National Industrial Recovery Act to which I referred, in the discussions which concerned Section 2 of the Clayton Act at the time it was before Congress about twenty years ago. You may recall that in that Section 2 there is a provision which permits price discrimination in respect to grade, quality or quantity. The first two, of course, are meaningless because a price discrimination in respect to grade or quality is nothing more than the equivalent of permitting you to charge more or less for something which costs more or less as the case may be, and therefore the only point there is in that provision of Section 2 that has real meaning is that relating to discrimination because of quantity. That particular word in the proviso to which I referred was discussed at considerable length in connection with the debates on the Clayton Act, and one might read into those debates a desire on the part of Congress to eliminate by its legislation all such price discrimination, but in the final passing of the act, as you know, elimination of such price discrimination was not embodied in the law.

In the National Industrial Recovery Act in the provisions to which I have referred under Section 3 A, the desire, if not the intent, of the Congress appears to have been running in much the same channels; that is also indicated, I believe, by referring to the discussions of parts of the National Industrial Recovery Act before it was finally enacted. It is not quite so clear in the later case as it was in the earlier case in connection with the debates, perhaps because when the act was under discussion the time was very much shorter. However, if you take your text from the proviso which I quoted, that the code shall not be designed to promote monopolies or to eliminate or oppress small enterprises, I think you will find there, at least by construction or interpretation, your guide to the elimination of quantity discounts or differentials as entirely justifiable in the purpose of the legislation.

"Functional" Differential Is Recognized

I may have led you to believe from what I previously said that there is no recognition of quantity discounts in the steel code. That may or may not be strictly true, but I think the safest way to interpret what I shall presently say is that the steel code does not provide any quantity discounts in any way whatsoever. The basic principle of the steel code with reference to prices is the open price policy. Every member of the code must file a price for each product covered by the code which such member produces. Those prices may be expressed either in cents per pound or dollars per ton or with respect to some other unit of measure, but generally speaking the prices quoted, or the prices filed by members of the steel code apply by implication to

quantities in carload lots, that being the unit of sale which has been customary in the steel industry for a long time.

If in filing a list of base prices for products as required by the steel code the member of the code indicates in such price filing that a discount or a price differential may be allowed on any product to a jobber, then a deviation from the price as filed for other classes of purchasers may be allowed to such purchasers as can qualify under the rules or regulations prescribed with respect to sales to jobbers. The differential, therefore, is not a quantity differential in the sense that you are talking about that subject here, but is a functional differential separate from the question of quantity, because the large jobber gets the same differential as the smaller jobber; it is not a differential that is based on quantity but on function, and that deviation or exception to the one price to all classes of purchasers was written into the steel code because of the recognition on the part of the members of the industry who were concerned with the drafting of the code that for many members of the industry the jobber or the jobbing trade represents an important part of the system of distributing steel products to the ultimate consumer thereof. It was solely because of that recognition of the functional part played by jobbers that there was any deviation whatsoever in the steel code from the idea of one price to all classes of purchasers irrespective of the quantity which they buy.

I say irrespective of the quantity which they buy—I speak in terms of carload units. There are in respect to certain products amounts added, so-called quantity extras added, for very small lots purchased. That I should refer to—although it is not in the nature of a quantity discount—in order that it might be perfectly clear precisely how the system operates under the steel code. It is not invariably true that less-than-carload quantities have a different price from the carload quantity, but in respect to some products very small fractions of a carload lot do have an extra charged for reasons which are well founded in the practices of the industry and the conditions under which the industry must operate.

Quantity Differential Encourages Unfair Competition

I think it is the belief of the members of the steel code that granting a price differential to the large purchaser can fairly be construed as unfair competition in respect to the purchaser of steel products, creating conditions of unfair competition. The large-scale producer using steel as a material for contracting purposes or processing into the finished product is supposed in theory at least to have an advantage in its scale of operations; if that is true the large-scale producer does not need in addition a better price in order to live. If the large producer has a better price than the small producer the small producer or the small purchaser starts out with a handicap in competition, and it must in the long run tend to work to the disadvantage of the small purchaser and to the advantage of the large purchaser. The cumulative effect in the one case to make the large purchaser still larger and the small purchaser still smaller, means that allowing the system to run its natural course would ordinarily tend to eliminate the small purchaser and to perpetuate the large purchaser.

Now, if your National Industrial Recovery Act really means that codes shall not be designed to promote monopolies or to eliminate or oppress small enterprise it would seem that if that line of reasoning is sound that the system of quantity discounts is not compatible with the provisions of the law. I would like to call attention there to the fact that the Government itself long since set an example in respect to no quantity differentials or discounts, first, in respect to what one pays for postage; the person who ships one package by parcel post pays the same rate as the shipper of thousands of packages by parcel post. In connection with railroad freight rates, if you purchased a service of transportation from the railroad—and you are a purchaser when you ship by railroad—you pay the same rate if you ship one carload as if you shipped a thousand or a hundred thousand cars, and the Government has set up one of its most important agencies to see that that is religiously adhered to at all times. In these elements of the background of what we may call legislative thought on the subject of quantity differentials or discounts, we believe that we find full justification for support, if not necessity, for eliminating quantity differentials or discounts under the steel code.

So far in the administration of the steel code, and it has been in operation now since the 19th of August, 1933, we have had relatively few criticisms from purchasers in respect to the matter of quantity differentials. The general tendency or the general attitude among purchasers appears to be that if they, particularly as small purchasers, can be sure that the price of their material is as good as the price of the material which is being bought by their competitors, they as users of steel are perfectly willing to take their chances in holding their place in the market or in the industry in which they are doing business.

Chairman Henderson's Examination of Mr. Tower

At the conclusion of his address Mr. Tower was questioned by Leon Henderson, chief, research and planning division of the NRA, who, with Divisional Administrator A. W. Riley, presided as co-chairman of the meeting on small enterprises and minorities. The examination follows:

Chairman Henderson: As I understand it, in your discussion of less-than-carload lots, you said that the quantity extra status was made to conform with the usual practice that had grown up in the trade prior to the code?

Mr. Tower: The quantity extra for small lots should not be referred to without qualification as applying to less-than-carload quantities, because for many products there is no quantity extra for less-than-carload quantities unless the quantity has shrunk to a minor fraction of a carload.

For most products under the steel code, the railroad tariffs provide 40,000 lb. as the minimum carload, or 20 tons. For some products in some other places, it may be a minimum as high as 25 tons.

With a few exceptions, the quantity extra for less-than-carload lots does not begin to operate until the quantity to be shipped at one time has shrunk to as little as 5 tons. In other words, the small purchaser of less-than-carload amounts that are still down to, say, one-fourth of a carload in many, if not most cases, is still accorded the same price as the carload purchaser.

Chairman: On the matter of nails, for example, we had a witness last week, as I recall, who seemed to feel that the status of quantity extras had been shifted in the making of the code.

Mr. Tower: I do not think that the status of the quantity extras had been shifted so much as it had been restored. Most extras, like most base prices, had separate rate violations and worse than that during the period from 1930 to 1933, and the practically complete elimination of charges which previously or for a long time had been customary disappeared in that destructive competition, and the restoration of those charges which had been generally justifiable is, I believe, the basis for criticism to which you refer.

Chairman: Some businesses grew up in that 1930 to 1933 period, based on the breakdown of what had been formerly trade customs? That is your feeling on that?

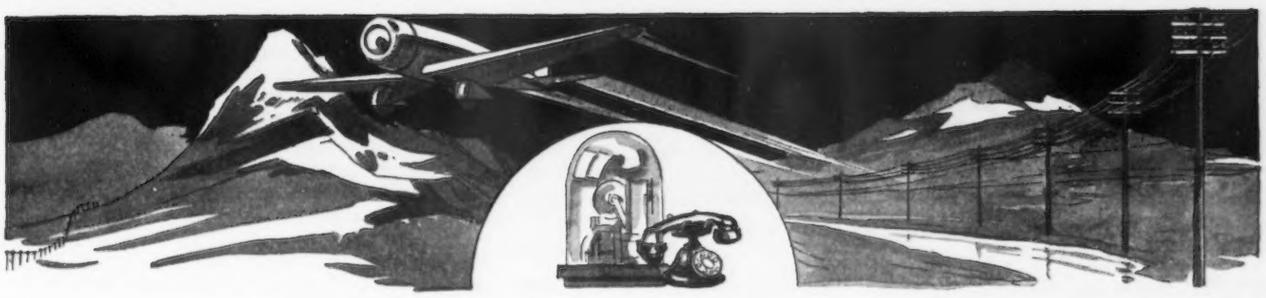
Mr. Tower: I do not know precisely what you mean by businesses growing up. My impression is that more of them were passing out, but if you mean that purchasers which previously did not enjoy a status as, we will say, jobbers, but during that period of ruthless selling practices they were treated as if they were jobbers, then I will agree with you that business did grow up during that period that previously had not enjoyed any such recognition.

Chairman: Did the price structure for steel products recede as much as the general price level during that period?

Mr. Tower: I do not know that I can qualify offhand as an authority on fluctuation of prices in general, but it is my impression that in order to make your comparison in respect to prices, particularly as they relate to a comparison of steel prices in general, you do not get the right answer if you start with 1928 or 1929 and come on through those distressful years, and that you must, in the case of steel prices, to make your comparison, go back to 1923, which was the peak of the post-war curve for steel products, and follow it through, because over that entire interval from 1923 to the end of 1933 there was a practically continuous and uninterrupted decline in steel prices.

Oddly enough, the extraordinary volume of activity in the steel industry in 1928 and 1929 went over a space of 18 months. There was a stable level of operation such as had never

(Concluded on Page 62)



THE NEWS OF THE WEEK

British Buyers Fear Iron Shortage; Finished Steel Active

LONDON, ENGLAND, March 13 (*By Cable*).—A keen demand is being maintained for British pig iron in spite of the recently increased rate of production through the lighting of additional furnaces. Contracts for Cleveland iron are being offered for the second half of 1934, the fear being that the supply will be inadequate. Export business in pig iron is small. The domestic price agreement concerning hematite has relieved uncertainty and sales are brisk.

Imports of semi-finished steel are increasing slightly but English works are still busy. Finished steel is more active and still further improvement is anticipated in view of new ship building orders and the seasonal springtime expansion of trade. Finished steel exports remain dull.

New business in tin plates is quiet but inquiry is better in view of the possibility of higher prices. Production of tin plates is now on a basis of between 55 and 60 per cent of capacity. Discussing reorganization of the iron and steel industry at a meeting of the tin plate makers' association, the need of cooperation in all branches was acknowledged but majority opinion was that the manufacturers of tin plate should continue their own association.

Continental iron and steel works are busy and spring demand is developing. There is good demand from the Far East but Japanese competition is severe in this quarter.

Sales office bookings for February are 40,000 tons heavier than for January. An impending increase in the price of beams has been authenticated. IRMA proposes to force Poland to join the international cartel by instituting a price war if necessary. It is now revealed that a broad flanged beam cartel was formed at Dusseldorf on Jan. 24 for a term of 5 years, with sales office at Luxemburg.

British and Continental prices remain unchanged from last week.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hrth.	£5 10s.	to	£5 12s. 6d.
Tin plate, per base box	16s. 3d.	to	16s. 9d.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hrth.	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£9 5s.		
Galvanized sheets, No. 24 gage	£11 5s.	to	£11 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

*Ingots	£2 5s.
*Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
*Steel bars, merchant	£3 2s. 6d.
*Sheet bars	£2 8s.
Plates, ¼ in. and up	£4 1s. 6d.
*Plates, 3/16 in. and 5 mm.	£4 3s. 6d.
*Sheets, ⅛ in.	£4 8s. 6d.
*Ship plates	£4 10s.
*Beams, Thomas	£2 19s.
*Angles (Basic)	£3 2s. 6d.
Hoops and strip steel over 6-in. base	£3 17s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

*Prices as established by European Raw Steel Cartel.

Protest All-Rail Prices Quoted Under Codes

IN the interest of shippers and consumers in the Middle West and the South who have heretofore been benefited by low cost transportation on inland waterways, the Mississippi Valley Association has protested the provision of the code of fair competition for the iron and steel industry which provides generally for the quoting of delivered prices on the basis of the rail rate to destination and similar provisions in other codes. At the recent annual meeting of the association, which was attended by 437 registered delegates from 26 states, the following resolution was unanimously adopted and transmitted to Washington.

"It is the sense of the traffic committee that the existing provisions of industrial codes which require the making of delivered prices wholly upon the basis of all-rail rates are inimical to the interests of the consumers, unjustly eliminate all forms of transportation other than railroads from participation in valuable traffic, and tend to destroy water carriers and port facilities. We urge the association to petition the administrator of the NRA to set up machinery whereby use may be made of inland waterway rates and routes, and to require that such provisions be inserted in all existing codes and those hereafter put into effect."

In a letter to A. D. Whiteside, deputy administrator of the NRA, the association said: "Under the authority of the existing steel code ocean rates and ocean-rail freight rates are recognized and shippers are authorized to use these facilities. River rates for pig iron shipments are also recognized. No provision is made by the steel code, or under its authority, for giving to the public the benefit of low cost transportation by inland waterways on steel and steel products. It is our judgment that this is a serious omission which denies shippers and consumers of steel products the benefit of proper savings by the use of these public water routes which have been improved and are maintained as Government projects in the same manner as have our seacoast and Great Lakes channels and harbors.

Steel Corporation's Wages Rise 25 Per Cent in 1933

Sales Volume Shows Gain But Average Prices Realized Fell Below Those of 1932

BOTH wages and employment were materially increased by the United States Steel Corpn. in 1933, to carry out the spirit of iron and steel code. Although the Corporation had anticipated the reduction of the work week through the application of the "share the work" movement inaugurated in the early fall of 1930, it nevertheless succeeded in carrying the principle still further, according to its pamphlet report for 1933. In the first quarter it had a total number of 145,988 employees working; in the fourth quarter, it had 190,454. Average hourly wage and salary rates were advanced approximately 25 per cent over the rates paid in June, prior to the adoption of the code.

A 15 per cent advance was made effective on July 16. Later because of limitation on working hours per week by the code it became necessary to place all men on the 8-hr. turn. This was followed by a further increase in the wage rates of employees who formerly worked longer turns. The average hourly rate of all employees in December was 66c. compared with 53c. in June. This 25 per cent gain compares with a 15 per cent reduction in the salaries and wages of all employees which was put into effect May 16, 1932.

Average prices received for steel products shipped during 1933 were lower than in 1932. Calculated on the same weighted basis for both years, the net price received from domestic shipments was $2 a ton less than in 1932, for export shipments $5.01 less than in 1932, and for the two combined $2.21 less than in the preceding year. During the earlier months of the year there was constant decrease in the average price received monthly, the average domestic price realized in July having been $4.06 per ton less than the average for 1932, which latter was $8.74 a ton less than the 1929 realized average price.

Business volume showed a substantial increase in 1933. Ingot operations averaged 29 per cent for the year, compared with 18 per cent in 1932. Ingot production for the year showed an increase of 63.3 per cent over 1932, as compared with a gain of nearly 72 per cent for the entire industry. Output of finished iron and steel products rose 54.2 per cent.

Shipments of rolled and finished products in the year totaled 5,805,235 tons, compared with 3,974,062 tons in 1932, a gain of 46.1 per cent. Last year's export shipments of finished products totaled 399,434 tons, compared with 232,255 tons in 1932, a gain of 72 per cent.

The money value of business transacted during 1933 was $524,968,768, compared with $357,201,705 in 1932. These receipts are inclusive of intercompany sales and gross revenue from both outside shippers and from subsidiary companies of the corporation.

During the year the corporation expended $39,211,913 for ordinary repairs and maintenance, blast furnace and coke oven relinings and extraordinary replacements, compared with $28,279,593 in 1932. The total amount expended and appropriated from earnings for maintenance, depletion, depreciation and obsolescence of investment in tangible property was $83,754,187, compared with $69,432,417 in 1932.

Total taxes paid last year were $32,558,544, equal to $5.88 on every ton of rolled and finished steel produced.

The iron mining properties and facilities in the Lake Superior district and the Great Lakes transportation service were operated at only about 40 per cent of their capacity in 1933, although on a much larger scale than in 1932. The proportion of the fixed expenses not allocable to cost of ore shipped was charged direct to profit and loss, this amount being $7,468,237, of which $6,341,435 represented taxes on idle properties and plants.

Inventories at the close of the year

Production of Raw, Semi-Finished and Finished Products by Subsidiary Companies of the United States Steel Corpn. in the Years 1933 and 1932

Products	1933 Tons	1932 Tons	1933 Increase Tons	1933 Increase Per Cent
Ores Mined				
In the Lake Superior region (iron ore)	7,394,086	2,759,075	4,635,011	168.0
In the Southern region—Alabama (iron ore)	939,633	819,299	120,334	14.7
In Brazil, S. A. (manganese ore)	.....	25,829	*25,829	*100.0
In Tennessee (zinc ore)	12,048	12,116	*68	*0.6
Total	8,345,767	3,616,319	4,729,448	130.8
Limestone Quarried—Includes dolomite, cement rock, shale and fluorspar	5,410,752	3,203,029	2,207,723	68.9
Coal Mined				
For use in the manufacture of coke	6,744,427	4,271,542	2,472,885	57.9
For steam, gas and all other purposes	3,482,803	2,775,228	707,575	25.5
Total	10,227,230	7,046,770	3,180,460	45.1
Coke Manufactured				
In beehive ovens	9,408	1,644	7,764	472.3
In by-products ovens	4,870,377	2,964,839	1,905,538	64.3
Total	4,879,785	2,966,483	1,913,302	64.5
Blast Furnace Production				
Pig iron	4,951,630	3,070,119	1,881,511	61.3
Spiegel, ferromanganese and ferrosilicon	74,579	52,811	21,768	41.2
Total	5,026,209	3,122,930	1,903,279	60.9
Steel Ingot Production				
Bessemer ingots	1,528,446	1,084,102	444,344	41.0
Open-hearth ingots	6,518,549	3,845,134	2,673,415	69.5
Total	8,046,995	4,929,236	3,117,759	63.3
Rolled and Finished Steel Products for Sale				
Steel rails (heavy and light tee and girder)	231,753	187,560	44,193	23.6
Blooms, billets, slabs, sheet and tin plate bars	682,386	401,407	280,979	70.0
Plates	311,858	157,106	154,752	98.5
Heavy structural shapes	293,794	240,208	53,586	22.3
Merchant bars, hoops, skelp, light shapes, etc.	1,174,459	687,526	486,933	70.8
Tubing and pipe	351,916	233,094	118,822	51.0
Wire rods, wire and wire products	901,184	565,299	335,885	59.4
Sheets (black and galvanized) and tin plate	1,169,606	662,394	507,212	76.6
Finished structural work	155,264	268,501	*113,237	*42.2
Angle splice bars and all other rail joints	58,980	49,029	9,951	20.3
Spikes, bolts, nuts and rivets	18,346	13,819	4,527	32.8
Axles	2,949	1,420	1,529	107.7
Steel car wheels	31,675	23,899	7,776	32.5
Sundry steel and iron products	152,152	100,212	51,940	51.8
Total	5,536,322	3,591,474	1,944,848	54.2
Miscellaneous Products				
Zinc	27,145	5,422	21,723	400.6
Sulphate of iron	16,696	14,848	1,848	12.4
Ground basic open-hearth slag	28,517	2,071	26,446	1,277.0
Ammonia (in sulphate equivalent)	83,589	55,445	28,144	50.8
Benzol products	72,677	45,758	26,919	58.8
Gypsum	37,147	33,797	3,350	9.9
Portland cement (bbl.)	6,957,100	7,113,300	*156,200	*2.2

*Decrease.

were valued at $252,331,033 compared with $258,354,253 at the close of the preceding year.

The average number of hours worked per employee reached its maximum at 35.4 per week for the quarter ended Sept. 30. It was at its low—24.5 hr.—in the first quarter. The average for the year was 30.4. The average number of employees for the year was 172,577, the maximum having been 197,184 in the third quarter.

Pensions were granted to 1306 retiring employees, and at the close of the year there were 12,230 names on the pension rolls, a net increase of 546 during the year. Because of the unprofitable operations of the corporation, pension rates were reduced, effective April 1, for all pensioners except those receiving pensions of $35 and less a month. Reductions ranged from 5 per cent to a maximum of 25 per cent. The average pension paid last year was $57.85 a month, compared with $69.45 in the previous year. Total expenditures for pensions were $7,716,304, compared with $7,524,487 in 1932.

Blast furnace capacity remained unchanged at 21,108,000 tons and capacity in steel ingots and castings at 27,341,000 tons, but capacity in finished rolled products for sale rose slightly from 19,269,500 tons to 19,271,200 tons.

Steel Employment Close To 1929 Peak

A RECENT statement of Secretary of Labor Frances Perkins before the NRA code authorities that 300,000 people normally attached to the iron and steel industry are now unemployed has been questioned by Walter S. Tower, executive secretary of the American Iron and Steel Institute, New York.

Secretary Perkins' estimate, according to Mr. Tower, may have included branches of metal-working trades other than that defined by the iron and steel code of fair competition.

"Figures of employment in the iron and steel industry just compiled for January by the American Iron and Steel Institute show a total of 393,000 people on the payrolls," said Mr. Tower.

"This compares with peak of employment in the industry in 1929 of approximately 420,000, indicating that all but about 27,000 iron and steel workers have been reabsorbed.

"Employment in the iron and steel industry dropped to about 210,000 at the bottom of the depression in 1932 and from that low point more than 180,000 people have been put back on the payrolls in the industry.

"Last June, when steel mill operations were near 46 per cent of capacity, employment stood at 338,000. In January, with operations at only 34 per cent of capacity fully 55,000 more people were employed in the iron and steel industry than in June, as a result of compliance by the industry with the employment provisions of the iron and steel code."

Comparison of Employees, Hours, Wages and Average Earnings per Hour Reported by Members of Iron and Steel Code

January and Figures to Date from September, 1933

	January	Averages and Totals from Sept. 1, 1933
Employees receiving hourly piece-work or tonnage wages:		
Number of employees	355,292	367,119
Total hours worked.	45,898,885	239,432,557
Average hours per week per employee	29.2	29.8
Total wages	$26,737,393	$138,012,873
Average earnings per hour	58.3c.	57.6c.
All employees receiving wages and salaries:		
Number of employees	393,013	404,510
Total hours worked.	52,754,455	272,720,967
Average hours per week per employee	30.3	30.8
Total wages	$34,877,542	$177,672,846
Average earnings per hour	66.1c.	65.1c.

Budd Employees Favor Their Own Union

EMPLOYEES of the Edward G. Budd Mfg. Co., Philadelphia, voted last week by a margin of more than three to two in favor of retention of the existing employee representation plan as opposed to affiliation with a national labor union. The balloting showed 3152 voting in favor of the plan against 1995 voting for membership in the United Automobile Workers' Union, an American Federation of Labor affiliate.

The election was held under the auspices of 19 employee representatives in the face of a postponement order issued on the preceding day by William H. Davis, compliance director of the NRA.

Preparing For N. A. P. A. Convention in Cleveland

UNDER the leadership of Ralph G. Sweeney, purchasing agents of Cleveland are actively preparing for the 1934 Convention of the National Association of Purchasing Agents, Inc., scheduled for Cleveland during the week of June 18.

General Convention Committee Chairman Sweeney, who is purchasing agent of the Allyne-Ryan Foundry Co., and also president of the Purchasing Agents Association of Cleveland, has appointed a committee of 18 to assist him in staging a convention and Informashow which, it is widely believed, will mark the return of recovery under the new deal.

All of the convention sessions and the Informashow will be housed in Hotel Cleveland, a part of Cleveland's famous Terminal group. Preliminary reservations already have been placed for a large portion of the 15,000 sq. ft. of Informashow exhibit space; however, actual allotments will not be made until the space diagram and detailed information have been distributed.

Code Authority Named By Gray Iron Group

THE Gray Iron Founders' Society, Inc., Cleveland, sponsor of a code of fair competition for gray iron jobbing foundries, has named the following six directors of the society as representatives of the society on the code authority for the industry: F. R. Hoadley, Farrel-Birmingham Co., Ansonia, Conn.; C. D. Branston, Campbell-Wyant & Cannon Foundry Co., Muskegon, Mich.; C. B. Magrath, North Western Foundry Co., Chicago; W. A. Rigsby, Lombard Iron Works & Supply Co., Augusta, Ga.; A. B. Root, Jr., Hunt-Spiller Mfg. Co., Boston, and W. H. Winters, American Brake Shoe & Foundry Co., New York. Balloting for two representatives of non-members is now taking place.

The Society has moved to enlarged quarters in the Public Square Building, 38 Public Square, Cleveland.

Beneficiated Ore Shipments in 1933

BENEFICIATED iron ore shipped from mines during 1933 totaled 6,951,533 tons, according to the Lake Superior Iron Ore Association. Revised details are shown in the following table:

Beneficiated Ore Shipments in 1933
(In Gross Tons)

Method of Beneficiation	Minnesota	Michigan and Wisconsin	Total
Washed concentrates	2,331,328	.....	2,331,328
Jigged concentrates	489,387	.....	489,387
Sintered ore	48,163	.....	48,163
Sinter-dried ore	149,824	.....	149,824
Dried ore	115,955	.....	115,955
Total concentrates	3,134,657	.....	3,134,657
Crushed and/or screened	1,848,096	1,968,780	3,816,876
Total beneficiated.	4,982,753	1,968,780	6,951,533

Trackwork Shipments Higher in February

SHIPMENTS of trackwork for tee rail track of 60 lb. a yd. and heavier in February amounted to 3310 net tons, according to the American Iron and Steel Institute, compared with 2811 tons in January and with 1822 tons in February, 1933.

International Nickel Earned Nearly $10,000,000 Net in 1933

THE report of The International Nickel Co. of Canada, Limited, for the year ended Dec. 31, 1933, which was mailed Monday of this week to shareholders, shows a net profit of $9,662,583.64 after all charges including provision of $3,551,653.32 for depreciation and mine depletion. After disbursement of $1,933,898.75 in preferred dividends, there remained $7,728,684.89, equal to 53c. per share on the common stock. In addition the exchange adjustments and profit for the year amounted to $1,739,617.06 which was carried to contingent reserve.

The net profit of $9,662,583.64, exclusive of exchange adjustments and profit, compares with a net loss of $135,344.65 for 1932, which included exchange losses.

Net *operating income* was $14,219,988.10, as compared with $3,363,399.86 in 1932; and as a result of this improvement, earned surplus rose from $14,688,559.89 as of the close of 1932 to $22,767,570.30 as of Dec. 31, 1933. Cash and securities increased from $5,793,100.32 at the end of 1932 to $15,616,011.71 at the close of 1933.

Recently the directors declared a dividend of 10c. per share on the common stock, payable March 31. The last previous payment was one of five cents per share, which was paid on Dec. 31, 1931. Dividends on the preferred stock have been paid without intermission for the past twenty-eight years.

Important financial operations during the past year included the purchase of 25,790 shares of the capital stock of Ontario Refining Co., Limited, and advance payment of the $300,000 five per cent serial purchase money notes maturing in 1934. These disbursements, which totaled $3,300,021.75, were made from current funds. International Nickel's stock interest in Ontario Refining now amounts to 67.79 per cent, and the report indicates that this interest may be further increased.

Capital expenditure for 1933 amounted to $448,624.72 compared with $535,651.83 for 1932 and $4,679,435.46 for 1931. The major items of capital expenditure planned for 1934 involve an outlay during the year of approximately $1,700,000. Of this approximately $1,000,000 will be spent for additional converting and blowing capacity at the Copper Cliff Smelter, the balance being required for the year in connection with a three-year exploratory and development program announced for the Frood and Creighton mines.

Robert C. Stanley, president, who signs the report, points out that, beginning with the second quarter of 1933, profits have been realized each month and that the improvement has been well spread among all consuming fields.

Welded Stainless Tank Makes Size Record

ALLOY PRODUCTS CO., Waukesha, Wis., is about to make delivery to the Anheuser-Busch Brewing Co., St. Louis, of what is considered the largest stainless steel welded tank in existence, measuring 18 ft. in diameter and 24 ft. in length, with a capacity of 38,000 gal., or 1225 bbl. It will be installed vertically on a special foundation to accommodate its weight of 365,000 lb. The Waukesha plant is also filling substantial orders for stainless steel tanks for evaporated milk plants, manufacturers of toothpastes, shaving creams, chocolates, etc.

Sloss-Sheffield Steel Opens Chicago Office

SLOSS-SHEFFIELD STEEL & IRON CO., Birmingham, has opened a direct company sales office in Chicago, at 333 N. Michigan Ave. Henry Clarke has been appointed resident manager. Mr. Clarke is thoroughly experienced in Southern iron, having had many years of metallurgical experience with various Southern foundries and during the past four years was in the sales department of Sloss-Sheffield.

U. S. Steel Shipments Higher in February

SHIPMENTS of finished steel products by the subsidiary companies of the United States Steel Corpn. amounted to 385,500 tons during February and were at the rate of 26.3 per cent of the corporation's rated capacity, as of Jan. 1, 1934, of 19,271,200 tons. January shipments were 331,777 tons or 19.9 per cent of revised capacity for this year. February shipments were 275,929 tons in 1933, 413,001 tons in 1932 and 762,522 tons in 1931.

Year-end adjustments in shipments resulted in an addition of 44,283 tons to the total for last year, the revised figure for 1933 having been 5,805,235 tons. Detailed figures are shown in the accompanying table.

Booklets Give Data on Metal Cutting Saws

COMPREHENSIVE data on the selection, use and maintenance of Disston metal cutting saws—circular, band and hack—and files are given in a series of booklets issued by Henry Disston & Sons, Inc., Philadelphia.

The booklets on circular saws include one on screw slotting, metal slitting and milling, tube and hot saws, and friction disks. Another is devoted to inserted-tooth saws of both improved interlock and sectional interlock types. Data include tables giving saw diameter, number of teeth, kerf, and angles for cutting material of various sizes, and general practice in feeds and speeds. There are also tables showing diameters of saw that can be accommodated and capacities of a number of sizes of different cutting-off machines. Instructions for grinding and for inserting the teeth are included. Carboloy-fitted solid and inserted tooth saws are dealt with in a separate booklet, which discusses applications, speeds for cutting various materials, and the grinding and lapping of the teeth.

The booklet devoted to band saws covers both hard-edge and spring-tempered types. It includes specifications for cutting various materials with the hard-edge band saws; these are in tabular form and include number of teeth per inch, set, temper, and blade speed. There is also a table of blade lengths, and widths for various band saw machines.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

				1933		1934	
Month	1930	1931	1932	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity
January	1,104,168	800,031	426,271	285,138	17.7	331,777	19.8
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3
March	1,240,171	907,251	388,579	256,793	15.3	.....	...
April	1,188,456	878,558	395,091	335,321	21.6	.....	...
May	1,203,916	764,178	338,202	455,302	27.1	.....	...
June	984,739	653,104	324,746	603,937	37.4	.....	...
July	946,745	593,900	272,448	701,322	45.1	.....	...
August	947,402	573,372	291,688	668,155	39.8	.....	...
September	867,282	486,928	316,019	575,161	35.6	.....	...
October	784,648	476,032	310,007	572,897	35.5	.....	...
November	676,016	435,697	275,594	430,358	26.7	.....	...
December	579,098	351,211	227,576	600,639	38.7	.....	...
Plus yearly adjustment	(40,259)	(6,040)	(5,160)	(44,283)	...	.....	...
Total for year	11,624,294	7,676,744	3,974,062	5,805,235	30.1	.....	...

Revisions in Steel Extra Book

A NUMBER of additions and changes in the uniform extra book of the iron and steel industry have been made, effective March 1. The extra on hot-rolled open-hearth alloy steel bars, S. A. E. No. 52100, has been reduced from $2.80 to $2.40 per 100 lb. The extra on the same steel in billets has been reduced from $56 to $48 a gross ton. The extra on S. A. E. No. 52100 hot-rolled electric alloy steel bars has been reduced from $3.30 to $2.90 per 100 lb. The extra on the same steel in billets has been reduced from $66 to $58 a gross ton. These changes have been made on page 1, section 29.

The extra on cold-finished open-hearth alloy steel bars, S. A. E. No. 52100, has been reduced from $2.80 to $2.40 per 100 lb. The extra on cold-finished electric alloy steel bars in the same S. A. E. number has been reduced from $3.30 to $2.80 per 100 lb. These changes have been made on page 1, section 30.

Two new pages have been added to the extra book, page 37a, section 54 and page 1, section 74. They are reproduced on this page.

Other changes and additions to the extra book follow:

REROLLING BILLETS 4½ IN. AND LARGER FOR SEAMLESS PIPE

Extras for Size, Shape and Quality

To be added to base price for rerolling quality billets

Size extras — Same as for blooms and billets

Chemical extra—Same as for blooms and billets

*Quality—$3 per gross ton

Round blooms, 4½ in. to 9 in., inclusive—$10 per gross ton over equivalent area square bloom

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*This grade not guaranteed against surface defects.

No surface preparation, such as pickling, or chipping, is to be performed on this grade.

Section 1, Page 1

* * *

WIRE RODS, HOT ROLLED

Extra for Shape

Keystone lock washer rods—$18 per gross ton

Section 3, Page 1

* * *

Quantity Differentials on Hot Strip in South

Extras applying on all sales of hot-rolled strip for delivery at destination to which the Birmingham all-rail published tariff carload rate of freight is lower than the published all-rail carload rate of freight from either Pittsburgh or Chicago, are as follows:

	Per 100 Lb.
Quantities less than 2000 lb. but not less than 1000 lb.....	25c.
Quantities less than 1000 lb....	50c.

(Editor's note: In other districts quantities of less than 2000 lb. to 1000 lb. take a lump sum extra of $8, and quantities of less than 1000 lb. take a lump sum extra of $12).

Section 8, Page 3

* * *

CUTTING EXTRA ON PIPE FOR STRUCTURAL PURPOSES

Buttweld pipe for structural purposes only and so stenciled, not to be furnished for conveyance of gas, steam, liquids, or air; furnished in plain ends only and in carload quantities only, shipped from mill direct to user.

One-in. to 3-in., inclusive, buttweld pipe, in lengths 2 ft. 6 in. to 10 ft. 11⅞ in. in lots of not less than 500 pieces of one size and length of cut.

Net extra—One point lower discount (higher price) than for plain end random length pipe.

Section 60, Page 1

RAIL STEEL CONCRETE REINFORCING BARS

Extras for Engineering Detailing (Placing Plans and Bar Lists)

	Per Ton	Not to Exceed
Less than 100 tons..	$3.00	$250
100 to 199 tons.....	2.50	400
200 to 499 tons.....	2.00	750
500 to 999 tons.....	1.50	1,000
1000 and over tons..	1.00	

(Editor's note: Previously there was a flat charge of 15c. a lb. for detailing).

Section 12

* * *

HOT-ROLLED ALLOY STEEL S. A. E. 52100

Special Quality Extra, for S. A. E.-52100 or Modifications of S. A. E.-52100 for Similar Application

Where acceptance or rejection of the steel at the plants of either the producer or consumer is based upon microscopic and/or hardened or etched disk inspection, the special quality extra shall be as follows:

Bars, per 100 lb.....	$0.40
Billets, per gross ton.....	8.00

(Editor's note: The identical extra has been added to Section 30, page 4, under Cold-Finished Alloy Steel).

Section 29, Page 5

Reproduction of New Pages in Book of Extras for Iron and Steel Industry.

AMERICAN IRON AND STEEL INSTITUTE

DRAWN WIRE

STEEL HAIR-SPRING WIRE

ON 5 POUND SPOOLS CONTAINING ONE OR MORE PIECES

SIZE EXTRAS

	Per lb.		Per lb.		Per lb.
.030	BASE	.011	$0.60	.0065	$2.75
.018	$0.15	.010	.70	.006	3.00
.017	.30	.0095	1.10	.0055	3.30
.016	.35	.009	1.30	.006	2.80
.015	.30	.0085	1.60	.0045	4.30
.014	.35	.008	1.90	.004	5.00
.013	.40	.0075	2.20	.0035	8.00
.012	.50	.007	2.50	.003	9.00

Intermediate sizes take the size extra of the next smaller size.

QUANTITY EXTRAS

	Per lb.
100 lbs. of one size	BASE
50 to 99 lbs. of one size	$0.05
25 to 49 lbs. of one size	.10
10 to 24 lbs. of one size	.50
Less than 10 lbs. of one size	.60

SPOOLS

Spools are charged at 40c each and credited at like figure when returned to seller in good condition, carrying charges prepaid.

STONE WIRE

An ordinary grade of Steel Wire, several pieces in a coil, for all common usage; viz., Stove Pipe Wire, Haystack Wire, for tying purposes, and for general house and farm utility purposes. Put up in 5" I. D. paper wrapped coils of 12 pounds each, not suitable for or to be confused with High Grade Weaving Wire.

Extras over Base Price per 100 pounds

Size	Annealed	Galvanized
No. 16	BASE	BASE
17	$0.50	$0.50
18	.80	.80
19	.90	1.10
20	1.00	1.20
21	1.10	1.45
22	1.30	1.65

MARKET WIRE

Bright Market Wire Base.—Add to base price of Bright Market Wire the extra for size and finish.

Extras per 100 pounds

Size	Extra for Size	Copperoid	Tinned
No. 0 to 5	BASE	$0.35	$0.80
6	BASE	.35	.95
7	BASE	.35	.95
8	BASE	.35	.95
9	BASE	.35	.95
10	$0.05	.35	.95
11	.10	.35	.95
12 and 12½	.15	.35	.95
13	.25	.55	1.05
14	.35	.55	1.20
15	.55	.55	1.55
16	.75	.55	1.80
17	1.00	.80	2.05
18	1.50	.80	2.05

Even Weight Bundles, except 100 lb. bundles, which are considered Standard—5c per bundle extra.

QUANTITY EXTRAS

On Items of less than 1000 pounds, whether shipped in car or by local freight, following quantity extras, apply:

	Per 100 lbs.
Items of 500 lbs. to 999 lbs.	$0.25
Items of 300 lbs. to 499 lbs.	.50
Items of 200 lbs. to 299 lbs.	.75
Items of 100 lbs. to 199 lbs.	1.00

Effective 3-1-34 page 37a Sec. 54

AMERICAN IRON AND STEEL INSTITUTE

STEEL FENCE POSTS

ADVANCE OVER BASE PRICES

	Per net ton
All shapes weighing 1.25, 1.33, 1.50, 1.80, 2.00, 2.25, 2.60, 2.75 and 4.00 pounds per foot (not including tubular posts)	$3.00
Advance for all other weights or shapes except Angle End and Corner Posts and Tubular Posts	$10.00

QUANTITY EXTRAS

2000 or more	$1.00
1000 to 1999	2.00
500 to 999	5.00
Less than 500	9.00

EXTRA FOR FASTENERS

Any Type, including Self Fastening, 5c per Post.

EXTRA FOR SPECIAL ANALYSIS OF PAINT

3c per Post.

ADVANCE FOR GALVANIZING STEEL POSTS

$1.50 per 100 lbs. extra over painted price.

EXTRA FOR ANCHOR PLATES

When more than one Anchor Plate, not exceeding 28 square inches in area, is furnished on sections weight 1.12, 1.25 or 1.33 pounds per linear foot, add 5c net per plate.

When one Anchor Plate, not exceeding 28 square inches in area, is furnished on sections weighing 1.5 pounds per foot, add 3c net per plate.

For each additional Anchor Plate with same size limitations, add 5c net per plate.

On all Anchor Plates, maximum area 60 square inches, furnished on sections weighing 1.80 pounds per foot or more, add 5c per plate.

DEDUCTIONS

For omission of Anchor Plate from sections weighing 1.12, 1.25 and 1.33 pounds per foot, deduct 1c per post.

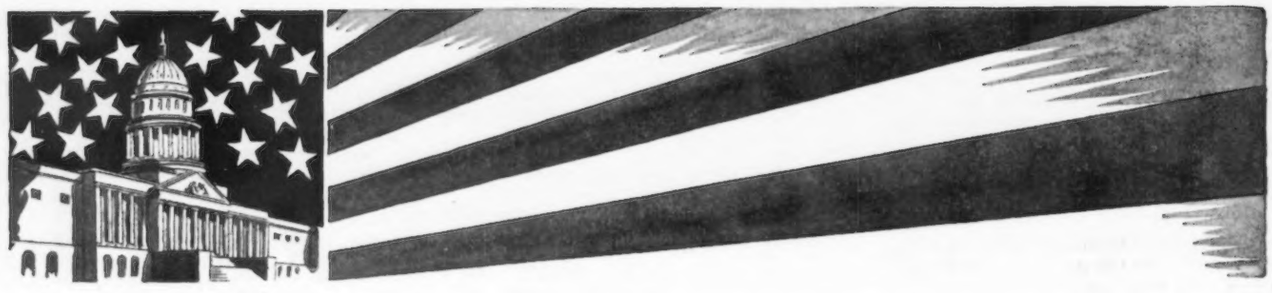
When unpainted posts are specified, deduct 1c per post. No deduction on galvanized finish

Effective 3-1-34 Sec. 74

Prices Filed With Institute

NEW lowest prices filed with the American Iron and Steel Institute follow:

Product Classification	Base Price Per 100 Lb.	F.O.B. Basing Point
Hot-rolled open-hearth strip steel (effective March 17).....	$1.85	Chicago
Wire nails (March 15)..	2.65	Houston and Galveston, Tex.
Low-carbon drawn spring wire (March 5).....	2.65	Pacific Coast Ports
Bessemer or basic manufacturers' wire (March 19).....	2.68	Houston and Galveston, Tex.
Chrome-silicon steel Carbon 0.40% Silicon 3.80% Chrome 2.20%	Per Lb.	
Electric furnace (March 19).....	5.14c.	Pittsburgh
	Per Gross Ton	
Low phosphorus pig iron (March 17).....	$19.00	Johnson City, Tenn.
	Per 100 Lb.	
Hot-rolled annealed wasters: No. 18 gage (effective March 19).....	1.35c.	Pittsburgh
No. 18 gage (effective March 19).....	1.45c.	Gary, Ind.
	Per Gross Ton	
Bessemer pig iron (March 22).....	$18.00	Birmingham, Ala.



THIS WEEK IN WASHINGTON

The NRA Considers Its Future

Grand Conference at Washington Is Disappointment to General Johnson—Industry Opposes Further Wage Increases—Labor Attitude Still Disturbing

By L. W. MOFFETT
Resident Washington Editor
THE IRON AGE

WASHINGTON, March 13.—The largest gathering of American business men ever held did not produce any immediate concrete results. The meeting last week of code authorities from all businesses and industries throughout the land therefore was a disappointment to Gen. Hugh S. Johnson, National Recovery Administrator. He told the employers as much. This, however, is not to say that the conferences will not ultimately yield highly important results.

The most definite development was the appointment of committees from the capital goods and consumers' goods industries to seek a solution to the problem of reemployment. Especial efforts to "activate" the capital goods industries where unemployment is greatest were proposed by General Johnson. He suggested a 10 per cent cut in working hours and a 10 per cent increase in wages. Although not to be applied flatly to all industries, the plan has met with stout resistance.

Capital goods industrialists not only oppose the plan, but demand a loosening of the securities act and modification of the pending stock exchange bill if private capital is to flow freely into investments so necessary to revival of the heavy goods industries. The administration, eager to relieve the Government from extraordinary financing of private capital, has indicated a favorable response to this attitude.

Labor Attitude Disturbing

Highly disturbing to industry is the administration's threat to "crack down" on alleged violators of labor sections of the recovery act. The showdown between industry and the NRA over the question of company unions seems to be near at hand and was given impetus by the salty remarks of General Johnson at the closing session of the code authority conferences.

These conferences brought out no definite plan for solution of the many subjects discussed. The material presented, however, is being analyzed and recommendations of a specific character may be made soon by the NRA. Many think the NRA has reached the cross roads and the route it is to follow must be based upon the outcome of the public and code conferences held under its auspices.

Labor is the outstanding issue, with shorter hours and increased wages as sponsored by President Roosevelt uppermost. Prices, control of production, and trade practices were discussed at great length but no determination of a program was reached. The subjects are so highly controversial that solutions seem remote.

The General "Cracks Down"

The grand finale of the code authority conference was in the nature of a warning from General Johnson in his best "crack down" form, which synchronized well with its challenging prelude by President Roosevelt. Both served notice of the necessity of reducing hours and increasing wages and of punishment for violation of the collective bargaining section of the recovery act. General Johnson told employers that as many as could ought to cut hours 10 per cent and increase wages similiarly.

"We know that some industries can do this," the Administrator said. "We know that in some cases it would be ineffective, but we know that in many there is no excuse for not doing it."

The President had not indicated how much of a reduction in hours of employment and how much of an increase in wages should be made but in opening the conference had declared both were necessary. General Johnson's parting shot was more specific. His reference to exceptions apparently included heavy industries, for he has said before that reductions in hours and increases in wages in these industries would not be effective because of present low operations. He has mentioned the "trades" in particular as being most able to reduce hours and increase wages.

General Johnson also served notice that the Government would "crack down" on violators of the collective bargaining section. He struck out at the company union and urged industry to play the game with organized labor.

"We have got to accord labor the rights guaranteed by this (recovery) act," said the General. "There is no law prohibiting a company union as such if there is no interposition whatever by employers and if the men freely choose it. But in 99 out of 100 instances you and I know that this is not the case. Let us act before Congress acts. Let us obey the law. Call in Senator Wagner's board. Let your men express their choice under those public auspices from which no ques-

tion can arise. Let's get this troublesome question settled promptly and for all time. Why suffer it? Play the game. Submit to the law and get it over quickly. I want to tell you this for your comfort. I know your problems. I would rather deal with Bill Green, John Lewis, Ed McGrady, Mike McDonough, George Berry and a host of others I could name, than with any Frankenstein that you may build up under the guise of a company union. In fact—take it from me and a wealth of experience—their interests are your interests and under the law and in this modern day, it is the best and quickest way to economic peace. Here is one cloud that we can erase from our horizon with one stroke. Let's do it."

Legislation Threatened

The General's warning to act before Congress does was taken to refer to the prospects of passage by Congress of the Connery 30-hr. bill, which was reported favorably to the House of Representatives on the day the conferences began. No doubt the move was timed for the event in the form of a threat that industry would either voluntarily reduce hours and increase wages or face the drastic provisions of the Connery bill. General Johnson has held that the measure is too severe but it apparently is being made a vehicle of utility to bring about voluntary reduction in hours of work and increases in wages. Likewise the Wagner bill to establish a permanent National Labor Board and abolish company unions is held by many to be a threat of similar character. Vigorous opposition will be registered against this bill at hearings which begin tomorrow before the Senate Committee on Education and Labor.

The condemnation of the company union by General Johnson followed upon the heels of an attack upon employee representation plans in the automobile and steel industries by National Compliance Director William H. Davis. Mr. Davis spoke with the authority of General Johnson and proposed to take the matter up with the code authorities. Speaking before the group on code administration, Mr. Davis said, "I am authorized by the Administrator to say that investigation by the compliance division has disclosed the fact that a great many printed plans of employee representation in the automobile industry and in the steel industry have shown that these plans contain provisions which, in the opinion of the Administrator, are continuing violations of the spirit of Section 7a, and continuing interference with the right of self-government of the employees.

"An example of such a provision which is commonly found in these plans is that there shall be no change in self-organization of the workers without the approval of the plant managers. We regard that as continuing interference with self-organization. It is a very widespread thing and it is proposed to treat it by mass action; that is, to take the matter up through the code authorities with all industries involved to bring the discussion, which is an important one, into the arena of NRA and to handle it, as we have handled all our discussions in the rather unique but thoroughly well approved system or tribunal of NRA; that is, the administrative agencies, with the industry represented by its code authorities, and by individuals, and with the advisory boards present."

Penal Action Promised

In his most salty style, General Johnson made it clear to the code authorities that NRA proposes to stir the Blue Eagle into belligerency against violators and is reorganizing to enforce the penal sections of the recovery act.

"Of course we can't succeed without public support of what we are trying to do," he said, "and I want to warn non-compliers that we are not only going out to revive public sentiment for the Blue Eagle but under specific orders from the President, we are reorganizing to enforce the penal sections of the act. Regardless of publicity, I have been too gentle. We deliberately delayed action because of misunderstandings but — if I may lapse into the vernacular—'You ain't seen nothin' yet'."

His remarks become all the more pertinent when recent steps regarding enforcement are recalled. The Connery 30-hr. bill is not classed as a direct force in the drive for enforcement but it is considered as a club hanging over the head of industry if it balks. More pointed is the Wagner bill to abolish company unions, etc., which, though it may never get through Congress is a reminder of the temper of the NRA. The notice of Mr. Davis, speaking for the NRA, was accepted as a direct "crack-down" move. The same may be said of the recent White House order removing from the National Compliance Board authority to review rulings of the National Labor Board and thus in effect notifying the compliance board to exact penalty as proposed by the labor board rulings. The pending cases charging violations are taking on a more stern tone. The Blue Eagle is to become a codified eagle, each industry and each unit of industry to have its own number and identification, a proposal readily acceptable to industry but one also intended to keep closer check on alleged violations.

NRA Seeking New Life

The NRA drive for shortening hours and increasing wages was also intensified as the result of the general meeting, for it received more recognition than has been widely believed. It was viewed as a cross section of public opinion and the NRA is plainly seeking to revive its standing through public support. There are many both within and without the NRA who think it is now at the turning point, either upward or downward and it is striving to take the former route.

General Johnson stated 12 objectives of the NRA after the recent public meeting but expressed disappointment at the results of the code authority conferences. He told the employers that he may have expected too much but had thought they would bring some plan, referring in particular to "economic planning."

"It is not a very satisfactory demonstration," he said, "that American industry has nothing to offer except objection. We have to plan our way out of this mud hole and that must be done by hard headed business men and not by academicians."

This thrust was evidently aimed at the brains trust for which General Johnson has contempt. But the General also was registering a complaint against industry and was holding it responsible for devising a plan to get back to the highroad of recovery.

Aid for Small Industries

The Business and Advisory Council for the Department of Commerce, through its chairman, Gerard Swope of the General Electric Co., presented a report from a committee to consider the needs of small industry, as affected by Codes. This committee, after a detailed study from reports and from individual statements from hundreds of small businesses, announced that at present there is no way of financial assistance to small business and industry over a longer period than the bankers can carry them, say for a period from three to five years. The committee recommended that the needs of small business and industry for such financing be sympathetically considered.

Another Swope Plan

Mr. Swope also issued a statement outlining a plan similar to the one he proposed last summer which would reduce Government control and set up greater industrial self-government. Mr. Swope, however, said he was not trying to crystallize any definite plan. He stated that conditions are changing so rapidly that "if we crystallized on a plan now, we would have to upset it."

The plan nevertheless received considerable attention from business especially in view of talk of a substitute for NRA. The Administration has said the recovery experiment is permanent and has asked for extension of the licensing provision of the recovery act. Unless extended the licensing provision will expire June

16. Mr. Swope supported the move to aid the capital goods industries but questioned the proposal for shorter hours and increased wage through an executive order.

An NRA View

Within the NRA itself dissension was evidenced by Dr. A. J. Hettinger of Detroit, a member of the NRA Division of Economic Research and Planning. After addressing the employment group of the code conference he was asked by General Johnson for his opinion on a possible employment program for a general 10 per cent reduction of hours from the 40-hr. week and a 10 per cent increase in wages, effectuated with the highest possible regard for flexibility in individual industries. Dr. Hettinger, long an advocate of stimulation of the capital goods industries, said he thought such a plan "a choice of evils." He stated that the dominant factor "is to put back to work the dollars and men where the bulk of unemployment exists, in the heavy industries." He added that less than 10 per cent of the unemployment was in the consumer industries. He stated further that the proposed 30-hr. week would "freeze the depression at its present levels, demoralize the cost structure, create innumerable inter-industrial difficulties and lessen the volume of physical production and real income."

"Mere shortening of hours," Dr. Hettinger said, "can be no complete solution to unemployment. The extent to which any further shortening of hours will represent a sound national industrial policy is a matter for the very careful consideration of the code conference. It is a common habit to oversimplify the possibilities of an endless series of reductions in hours per week as a solution to the unemployment problem. Such reasoning assumes complete mobility of labor as between geographical sections of the country and complete interchangeability of labor as between industries.

"The heart of the present unemployment situation rests in the capital goods industries, with the construction industry as the single dominant factor. Recovery in the heavy industries is also the key to any reduction of unemployment in the broad range of light service industries, with railroad employment being largely increased. On the other hand any mere increase in the dollar income that resulted from excessive lowering of hours and increasing wages in consumers' industries would be translated so rapidly into higher price levels for consumers' goods as to intensify the problem of the white collar worker in the service occupations."

Other Plans Suggested

In addressing the code conference group on trade practices as related to price, Henry A. Wise Wood, chairman of the code authority of the newspaper printing press builders' industry, recommended that all corporate investment in capital goods be exempt from Federal taxation. He said he believed this would stimulate the replacement of equipment. He repeated the suggestion at the capital goods meeting by reason of the statement of General Johnson that the code conference had failed to bring out new and helpful ideas.

F. R. Hoadley, member of the code authority of the gray iron foundry industry, told the employment group that any proposed reduction of hours and increase of wages would put the small foundry out of business.

Robert M. Gaylord of the machine tool and forging machinery industry, told the conference that the social loss of unemployment should be socialized through a modified CWA plan. He said that industry could not pay this loss. Mr. Gaylord also suggested that, while there may be faults in distribution, it is impossible to distribute goods not yet produced. He criticized what he termed the fallacy of returning to prosperity by cutting down production. He said that the capital goods industries must be encouraged and advocated "no tinkering" with present operations.

While the proposed amendment of Deputy Administrator George S. Brady to codes for the foundry, machine shop, and the sheet metal working industries was intended partially to relieve the shortage of skilled mechanics, that portion which would cut common labor hours to 36 per week was opposed by the employment group generally. As mentioned in THE IRON AGE of March 8, he suggested a 60-hr. week for skilled workers in the peak season with time and one-half pay for work in excess of 36 hr. per week.

Views on Price Control

While the session on price control saw sharply conflicting views, the system was strongly defended by representatives of many important manufacturing lines. Among those supporting the system was Herman Lind, general manager, National Machine Tool Builders' Association, who outlined a plan largely along the lines set forth in a statement at the NRA public hearing Feb. 27, an abstract of which was published in THE IRON AGE last week.

Divisional Administrator A. D. Whiteside told the group that the NRA was open-minded on the question of price control. He said the administration draws a clear distinction between the fundamental purposes which each provision is designed to effectuate and the abuses which may have resulted from improper administration of these various provisions. He directed attention to the fact that the administration further realizes that abuses are usually most flagrant during the initial stages of administration of code provisions and that economic laws, particularly that of supply and demand, will inevitably come into play as the final arbiter of price levels.

The effect of the open price policy of the machine tool industry on small enterprises was discussed by August H. Tuechter, president Cincinnati-Bickford Tool Co., Cincinnati, before the code authority conference on small enterprises and minorities.

"It is necessary," he said, "to look at the small business from two angles: First, as a buyer from industries operating on an open price plan, and, second, as a seller operating under a code of fair competition in his own industry. As a buyer, there are so many advantages accruing to the small enterprise, both directly and indirectly, that it is difficult to enumerate all of them.

"First and foremost probably is the advantage that he has in knowing that he is buying as cheaply and under as favorable conditions and terms as is the large competitor, and should the large purchasers be entitled to and openly be given a better price for quantities, he knows what these prices are, what they mean relative to the cost of his product and he is able to determine the advisability and probable gain or loss that would be his in stretching a point to put him into position to get for himself the advantages of other quantities or specifications and classifications."

Mr. Tuechter explained open price, as used in the machine tool industry, to mean the establishment by an individual company of a fixed price for its product, the price to be listed with the code authority and open to competitors and to the trade and from which there shall be no deviation on quotations made or orders received.

Refractories Makers Respond

First to respond to the President's appeal to industry and trade to further shorten work hours and increase purchasing power was the refractories industry which announced its readiness to adopt a 36-hr. week and maintaining the same weekly pay envelopes for the wage earners. This action would mean the almost immediate reemployment of more than 2000 workers. More than 20,000 persons now employed in the refractory industries are affected by the decision of the code authority to substitute for the 40-hr. maximum work week provision in its code a provision limiting common labor to an average of 36 hr. a week in any 30-day period.

The wage increase is to be accomplished by substitution, for the wage provisions of the code, of new provisions increasing the common labor minimum scales at least 10 per cent and providing for the maintenance of existing differentials for classes above common labor.

Demand Relief for Capital Goods Industries

Increased Credit Facilities And Not Shorter Hours At Higher Wages Are Pressing Need

WASHINGTON, March 13.—Expressing a belief that drastic provisions of the securities act of 1933 are the leading obstructions to recovery in the capital goods industries, George H. Houston, president of the Baldwin Locomotive Works, Philadelphia, speaking for the machinery and allied products industry, told the code conference group on employment last week that there will be no normal volume of capital flowing into enterprise until these provisions are corrected. Mr. Houston has been made chairman of a committee on capital goods selected at the request of General Hugh S. Johnson, which is seeking to devise means to reopen the market for such products.

The other members of the capital goods committee and industries they represent are as follows: J. S. Tritle, electrical manufacturers; Alvan Macauley, automobile manufacturers; R. W. Irwin, furniture manufacturers; H. Gerrish Smith, shipbuilding; S. F. Voorhees, construction; Charles R. Hook, iron and steel; C. R. Messenger, farm machinery; Lewis Brown, construction materials; J. R. Hoadley, gray iron; Henry S. Kimball, fabricated metals; Walter J. Kohler, construction equipment; C. C. Sheppard, lumber; James W. Hook, machine tools; F. A. Lorenz, steel castings.

Mr. Houston declared that there are also certain provisions of the banking act which prevent the financial institutions from participating, as they have in the past, in the underwriting of industrial securities. He said the pending stock exchange bill is a third reason for inability to market and distribute securities. Declaring that provisions of the banking act should be changed so that the banks can participate in industrial underwriting and that the stock exchange bill should be modified to permit marketing and distribution of securities upon whose investment the heavy industries depend, he called upon the Administration to support these proposals.

Export Market Needed

Mr. Houston pointed out that it is essential that the heavy industries sell abroad and also to the farmer and the producer of raw materials.

He explained that our products are already priced at too high a level to enter any of these markets and that we should constantly "strive to regain the proper balance between agricultural products and raw materials, and the products of other countries with which we compete in export markets. With the opening of the securities markets," he said, "I think there will be no question of unemployment in the heavy industries."

Mr. Houston reviewed the tremendous losses that the heavy industries have suffered during the depression and said that they cannot be continued for an indefinite length of time. These industries cannot absorb additional losses and any increased costs must be passed on to consumers.

In opposing shorter hours and increased wages, Mr. Houston said:

"We are already so high in our costs that we can not sell our goods. We cannot get our customers to anticipate their future needs, and what is true in my company is true in many others. We must keep our costs at a place that will encourage the producers of other goods to buy our products. They in turn will not do so unless they can see ahead of them a profitable use for these products."

Credit Badly Needed

It was pointed out that products are paid for with the proceeds of credit and that the heavy industries cannot exist, except when there is a flow of capital and credit into business. That flow has been practically stopped at the present time. In 1933 only $138,000,000 of new capital went into private enterprises of America while the normal volume is between $4,000,000,000 and $5,000,000,000 a year.

"We can not live with a situation of that kind," said Mr. Houston. "We certainly can not increase costs. We must reopen the capital markets of the country. We must again restore the flow of savings into enterprises. This is a situation in which the NRA and the Government as a whole can help us."

Opposes Further Reduction in Hours

Speaking as a representative of the machine tool industry, Robert Gayloe told of the practical difficulties that confront a management in a typical capital goods industry if it is determined to try compulsory reduction of the hours per week by law, by agreement, or by Executive order. He said that if that is done, hourly wage rates must and should be increased and prices will have to go up, with the result that the early demand that is developing will be retarded, if not extinguished.

Referring to the suggestion of Donald Richberg of the NRA that there were still many corporations with large surpluses and that they should be called on to disburse them in payrolls through shorter hours and higher wages, Mr. Gayloe said this would wipe out the smaller enterprises. The larger units now having surpluses and paying them out in higher wages would have to take whatever orders were offered. Furthermore, if a worker can secure a higher rate of pay in one shop than in another he will be permanently dissatisfied.

For a remedy, Mr. Gayloe proposed encouragement of the capital goods industries with orders. First, he proposed that the natural force of returning business recovery be permitted to produce the stimulating effect that it has in the past. He said it would do this if "we do not tinker further with our existing plans." These forces already represent a sharp advance and if there were an immediate return to the production efficiency developed in 1929 it would not be possible to produce enough goods at 40 hours a week to satisfy the demands of American standards of living.

"We have already anticipated the advance that would take place in the technology of production," said Mr. Gayloe, "and, have no fear, that advance will be there when we want it. I have no patience with those who believe that we have already reached the ultimate in production."

Let Confidence Grow

Mr. Gayloe suggested that the confidence which is already in evidence be permitted to grow stronger. Without it, he said, there will be little opportunity of inducing capital to make long-time investments. There is said to be plenty of money available which

will go into investment when confidence returns, if other factors are permitted to work naturally.

"I say naturally because I hear so many references to the lawless economy that existed throughout the 1920's. It is possible that our economy had laws and was a lawful one and that we disobeyed those laws. Very possibly, now chastened and now guarded by further governmental checks, we will not again violate them."

Mr. Gayloe agreed with Ralph E. Flanders that careful consideration should be given to a modified CWA, thus socializing the loss from unemployment. Industry, he said, cannot carry the loss and should not because it is not entirely responsible. He also urged that exceptions be permitted in codes to permit overtime work to meet unusual conditions which cannot be planned in advance.

Foundries Cannot Reduce Hours

Opposition to shortening of hours and to higher wages was expressed by R. R. Fauntleroy, of the Moulding Malleable Co., representing the malleable foundry code authority, who said that to do this would result in a decided increase in costs which customers could not pay. He spoke of competition with another industry in which labor is a smaller portion of costs and pointed out that raising the former's cost would penalize that industry in competition with the other. Fear also was expressed that reducing hours and paying the same weekly wage will check the rising business which all are experiencing and defeat the movement of putting more men back to work. The belief was stated that the code hours and wages should be left unchanged and that increasing business will absorb the foundry industry's portion of the unemployed.

Mr. Fauntleroy said there is already a dearth of semi-skilled and skilled help. Many plants, he stated, report they are already faced with a shortage of molders. During the depression, he stated, the industry had no opportunity to educate molders. One foundry in a large metropolitan center, it was stated, has found it impossible to recruit the number of skilled men necessary to put on a second shift. To decrease further the permissible working hours, it was said, would induce plants which have any reserves left to mechanize their foundries, reducing their need for labor.

Speaking as a representative of the code authority for the gray iron foundry industry, F. R. Hoadley, also a member of the capital goods committee, said a further reduction in hours would force many small foundries out of business because of increased costs, an unavoidable lag in obtaining higher prices and a lack of financial surplus to carry the small foundry through the interval of adjustment. Best evidence that small foundries are unusually vulnerable is obtained, he said, by examination of their credit ratings. Reduction of hours in this instance, it was pointed out, would cause increased unemployment. Mr. Hoadley explained that it is a peculiarity of hot metal industries that labor costs are from 35 to 50 per cent of total costs. Lessening hours per working day, even without a change in wage rates, he said, increases unit costs because a fixed amount of time is necessary for special foundry operations such as melting, molding, pouring castings, time for castings to cool before they can be moved, reconditioning of sand, etc. This was declared to limit the application of the shift plan in the foundry.

Labor Shortage Threatened

It was pointed out also that very few apprentices have been trained in the last five years. Assuming that the life in industry of the average molder is not in excess of 25 years after he has finished his apprenticeship, Mr. Hoadley said that old age and mortality have been taking the same number of men out of industry each year. The unescapable conclusion is that at present the gray foundry industry has 20 per cent less skilled craftsmen than in 1929. This, it was stated, has been intensified greatly by the maximum hours of labor set out in codes. He stated that a 40-hr. week is now permitted under the foundry code, which represents a decrease of 26 per cent in allowable working hours under 1926. Hours of trained molders were said now to be restricted due to a shortage of new men and by the code to the extent of only 59 per cent of that available in 1929.

F. A. Lorenz, representing the code authority for the steel foundry industry, and a member of the capital goods committee, said the code for that industry, which has been suffering losses for three years, had reduced hours 26 per cent and increased the labor rate approximately 16 2/3 per cent. The only effect the code has had to date, it was stated, has been to increase the losses of an already vexed industry because it could not find money to continue on. He said the code authority recently sent a questionnaire to the industry and was amazed to find that among the smaller units one out of every four felt that if costs were advanced further it would be forced to "give up the ghost and go out of business, as 55 other units of the industry have."

The questionnaire also revealed that it would be unwise in the industry to try to force the situation at this time, in that the effect would be wholly destructive. Rather it would be better that the forces of Government and industry be put to work to create a demand for capital goods to create credit for the industry on which to operate.

Committees at Work

The capital and consumers' goods committees are wrestling with the 12 points set out by General Johnson as the problems before the NRA now that it has entered the field of administration and enforcement. Certain it is, however, that the committees do not see eye to eye with the President and the NRA as to their flexible plan of general reduction in hours and increase in wages. Nor did the speeches of General Johnson and General Counsel Donald Richberg help matters. They were perhaps inspired by a heartened feeling over the Supreme Court decision in the New York milk case in which it upheld the right of NRA to fix prices.

Recommendations of the two committees are to be referred back to the code authorities and code committees. George Sloan, chairman of the consumers' committee said that it has two vital matters to consider, first, unemployment, and secondly, steps that may be taken by the consumers' industries to fortify the lagging recovery in many capital goods industries.

Government as Partner

These committees are at work at a time when the NRA has begun general action against violators of the recovery act and it is certain that violations of code agreements are widespread. The move toward prosecution clearly is merely a starter but offers an index to the prodigious task of Government policing of industry. The idea, however, is to restore self-regulation within industries, even though the code conferences rather clearly developed the fact that this also is proving to have most definite limitations. The NRA is proceeding on the theory that it is no longer an emergency organization but is a permanent set-up as a "partner" with business, yet it wants to supervise the partnership, and do the "regimenting" of labor and industry as it lifts the traditional competitive system from the annals of modern economic conditions. There are many doubters. There are many who think some principles underlying the NRA will be continued but that others will be shunted aside and that inevitably the days of competition under the old order will return with perhaps elimination of chiseling—or at least widespread chiseling.

The standing of Government and business as "partners" and the conduct of each may rest to a considerable extent on the outcome of the action of the capital goods and consumers' goods committees. While the Government is asking industry to cooperate, so is industry asking the Government to cooperate and on this give-and-take a great deal depends.

Proposed Tariff Legislation Is Meeting Much Opposition

WASHINGTON, March 13.—Lines already have been drawn in Congress for and against tariff legislation proposed by President Roosevelt. The bill, which would authorize the President to modify tariff rates within a 50 per cent range upward or downward, is before the House Committee on Ways and Means.

Giving the President unprecedented tariff powers, the legislation is likely to be more bitterly fought than any measure yet presented by the Roosevelt administration. Broadly the issue will be fought on partisan lines. However, there is evident an undercurrent of Democratic dissatisfaction at the idea of Congress yielding such authority to the President. This, coupled with opposition from progressive Republicans together with regular Republicans, is realized as offering formidable resistance to the legislation. It means that this session of Congress in all probability will be a long session, not a short session as had been originally contemplated by the Administration. The greatest opposition will be in the Senate.

U. S. Chamber Objects

Telling arguments against the bill as proposed were presented before the ways and means committee on March 9, by James A. Farrell, representing the Chamber of Commerce of the United States. Pointing out that the bill's provisions affect materially some of the basic principles of tariff making, Mr. Farrell directed the following remarks primarily to those principles.

The National Chamber's interest in reciprocal trade negotiations has been due in large part to the belief that the United States has been slower than other leading industrial nations to recognize the important place that foreign trade occupies as a stimulant to domestic recovery and as a permanent reinforcement of our national economic structure. The depression, since 1929, being one of drastic decline in buying power throughout the world, resulting in serious curtailment of international trade, has affected the United States more acutely than most countries and created a serious problem of unemployment.

It is estimated that 7,000,000 persons are dependent for their livelihood on our foreign trade. It is impossible, therefore, to deal effectively with the problem of unemployment without taking into account the vital importance of our overseas commerce as a means indispensable to the success of the National Recovery Act.

The policy of bargaining our way to the markets of the world by means of reciprocal trade agreements is one to which Congress should give careful consideration. Other countries have delegated these powers to the Executive and have already, as in the case of Great Britain and her Dominions, made considerable progress ahead of the United States in making foreign trade promotion instrumental to national economic recovery.

Our reciprocal trade agreements should be based on the unconditional most-favored-nation principle, and for this reason should avoid quotas and other artificial plans inconsistent with this principle. While our large excess of exports over imports—amounting last year to $226,000,000—supplies a field for investigation regarding the extent to which the United States, without injury to our essential domestic industries, may absorb an increasing volume of imports, the principle of reasonable and adequate protection of our home market is closely related to the problem of unemployment and the maintenance of our standard of living.

Bilateral trade agreements, as a long range view of foreign trade promotion, should be entered upon with the conscious aim of harmonizing each agreement with our trade relations with other countries. It has been urged, for example, that if we sell Russia dairy cattle, cotton and hogs on a long-term credit basis, we should arrange at the same time for imports of enough Russian manganese, furs, gold, platinum or other products to offset the sale. This has been recommended by some as barter on a refined basis. While it may be possible to buy from Russia an increasing proportion of some of these goods we cannot, without serious injury to United States interests, import, for example, Russian manganese in any quantity. Of the 500,000 tons of manganese required by our steel industries, 50,000 tons are obtained from domestic sources. The balance is imported from mines in Brazil, Cuba and the West coast of Africa, owned and operated by companies in the United States. Any diversion of this trade to Russia would mean the closing down of these mines, dislocation of labor, and loss to American investors. I refer to this as an example of loose thinking by some who profess to see in barter of this kind a return to international prosperity.

The fallacy that international trade means a dollar for dollar trade between two countries is the false premise upon which this idea of barter rests. A glance at the statistics relating to our foreign trade will indicate how impossible it is for the United States to agree to the proposition that she must buy from each country in value the equivalent of what she sells to that country. Our visible balance of trade is unfavorable with Latin America as a whole and with China, but favorable with Europe as a whole. If we follow the path of sane internationalism in our trade policies, we shall avoid in negotiations with any country deals that discriminate against other countries with whom it is necessary to maintain satisfactory trade relations.

Methods of Bargaining

Too frequently in discussing tariff bargaining emphasis is laid upon the reduction of rates of duty as the main instrumentality at the disposal of our negotiators. Too often, however, we shall find that the foreign negotiator is bargaining from a level made artificially high in advance of bargaining negotiations.

I should like to present for the record a study on "Reciprocal Tariff Negotiations" made by the Foreign Commerce Department of our organization outlining 14 varieties of considerations involved in tariff bargaining, with special information as to our trade and tariff relationships with Argentina, Brazil, Colombia, Portugal and Sweden—countries with which the United States has already undertaken to negotiate reciprocal agreements.

Our organization has long adhered to the principle that there should be "reasonable protection for American industries subject to destructive competition from abroad and which are of benefit to any considerable section of the country." This, we think, should be the first consideration. Reciprocal tariff negotiations should be secondary to it.

We would call attention, therefore, to the fact that the proposed bill, while placing a 50 per cent limitation upon the authority to modify duties, and also prohibiting the transfer of any article between the dutiable and free lists (both of which are part of the present flexible provisions of the tariff), does not contain the much more essential basic tariff formula of basing rates of duty, applying to any commodity, on the principle of equalizing foreign and domestic production costs plus transportation. When Congress delegates to the Executive authority to modify rates it is of first importance that Congress give indication to the Executive of its idea as to a "consistent tariff policy." In laying down a controlling formula, such as the equalization of production cost formula, to which the Executive should conform, whether changes be under a flexible tariff or under reciprocal negotiations, the Congress is contributing the composite views of its members as to what should constitute the basic tariff policy of the United States. And, further, by setting down such a formula it is supplementing the mathematical limitation of 50 per cent with a much more fundamental and desirable limitation which, in my opinion, would, as it has done in the case of the flexible tariff, help to assure the constitutionality of such delegation of authority.

The following three recommendations regarding the bill were made:

(1) That, in granting authority to make tariff changes in the interest of reciprocal tariff negotiations, the Congress write into the law the definite limitation that no rate be lowered to a point where American industry and agriculture shall be subjected to destructive foreign competition;

(2) That the flexible provisions of the tariff act be maintained, embodying a basic controlling formula, laid down by the Congress, according to which shall be determined the adequate protective level at which individual tariff rates shall be set; and

(3) That, through a Tariff Adjustment Board or other instrumentality, and in advance of such Board making its recommendations to the President, there be full opportunity for American businesses, likely to be affected by contemplated reciprocal tariff or other tariff changes, to present testimony as to the incidence upon their respective enterprises of such changes.

Collective Bargaining To Be Chief Issue at Automobile Hearing

DETROIT, March 13.

DESPITE the almost perfect setup at Washington in their behalf, with Senator Wagner sympathetic toward union labor's aspirations and with the Administration definitely showing a pro-labor tendency, automobile workers are not going to the hearing tomorrow before the National Labor Board with any illusions as to the chances of a sweeping victory.

Collective bargaining, and not increased wages, is the main issue at stake in the eyes of labor. Its leaders maintain that the important motor car manufacturers have consistently refused to deal with their employees except through so-called company unions, thereby violating section 7a of the National Recovery Act. Manufacturers, on the other hand, privately say that the crux of the controversy is whether the American Federation of Labor, representing a minority of automobile workers, shall be permitted to establish its right to be the sole spokesman for employees in the automobile industry.

Labor is apprehensive lest the industry, particularly General Motors, should take a stand alongside E. T. Weir in resisting further encroachment of the Government in support of the A. F. of L.'s program. Although it knows that it will be accorded sympathetic treatment at Washington tomorrow, it is not at all convinced that General Motors will agree to recognize the federation as the representative of the corporation's workers.

Public Opinion Against a Strike

Furthermore, the fact still exists unchallenged that the federation was forced by the impatience of its members to act as it did last week when it made demands on four automobile plants in this district. Its leaders at heart feel that the financial war-chest for a strike is meager and, even more important, that public opinion probably would frown upon a strike at this time in a vital industry, especially when the main question at issue is union recognition rather than oppressive working conditions and very low wages. They realize fully that they would have to stake everything on the outcome of a strike and if they came out on the short end, they would be "washed up" so far as the automobile industry is concerned.

What the leaders of the A. F. of L. are hoping is that they will win enough concessions at Washington to save their faces, with their membership. They can then return to the automotive district and say to the members, "Here is what we have done for you." Above all, they want to avoid a strike now.

Although no official statements are available regarding the position to be taken by spokesmen for the automobile industry at the hearing before the National Labor Board, it can safely be asserted that they will agree to further liberalization of their employee representation and works council plans, to simplification of the present bonus system for payment of production workers and to an increase in wages. However, in the case of at least one important company, a guarantee will be asked against disturbance of whatever wage agreement is made for a stated period, perhaps the remainder of this year.

It is believed that the industry will be adamant against granting recognition to the American Federation of Labor as the exclusive representative of employees in collective bargaining. It likewise will refuse the proposal that union officers assist in supervision of efficiency rating computations in automobile plants. This plan, amounting to giving the union a part in the actual management of the shop, is considered intolerable.

The first step already has been taken to liberalize company unions in the automobile industry. The National Automobile Chamber of Commerce has called to the attention of its members "the exception taken by the Compliance Board to some of the different Works Council or Employee Association plans, in order that the members may place the matter before the employee associations and that proper action may be taken to bring the plans completely into accord with the letter of the law."

Although ostensibly the only plants involved in the strike threat are the Buick Motor Co. and Fisher Body Corpn. at Flint and Hudson Motor Car Co. at Detroit, the discussion at the labor board's hearing will be an industry matter, with W. S. Knudsen, executive vice-president General Motors Corpn., as spokesman for management. Unionized workmen at Pontiac and Lansing, as well as at Flint and Detroit, have designated the labor delegation which leaves Detroit for Washington by special train tonight to represent them.

The American Federation of Labor has never given out any figures as to the total membership in its Automobile Workers Union of America. However, it is estimated that 100,000 men have joined this union, although some are not dues-paying members. Since approximately 300,000 men are at work in the industry today, this means that about one-third of the employees are linked up with the federation.

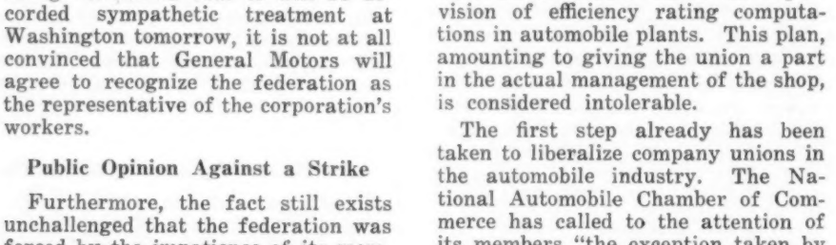
M. E. S. Challenging A. F. of L.

Several organizations are competing with the federation for the favor of workmen. The most powerful rival is the Mechanics Educational Society, which has formed a production workers' division, as announced in THE IRON AGE of March 8. The chief reason for the latest action of the M.E.S. is the conviction that tool and die makers cannot expect to do much in winning concessions from manufacturers without the support of production workers. The solidarity of the two elements in one organization is the present aim. The M.E.S. leans more to the left than the A. F. of L. and within its ranks is a considerable minority of Communistically-inclined skilled workers.

In Pontiac has grown up a new organization known as the Automobile Workers' Chamber, which is led by a group of radicals. As yet it does not possess any influence outside of local labor circles. The old Auto Workers Union, the Communist organization led by Phil Raymond, still is functioning, but little has been heard of it lately. The I.W.W., which called the strike at Murray Corpn. last fall, is continuing to maintain an office in Detroit, but its activities are reported to be languishing.

If the Washington meeting beginning tomorrow should reach an impasse, there may be a strike, as union employees of various plants have emphatically declared that if they don't get satisfaction at Washington, they will stop work. However, Detroit is firmly of the opinion that some sort of an agreement will come out of the meeting which will head off peremptory action by workers.

The research committee on fatigue of metals of the American Society for Testing Materials has entered into preliminary arrangements for an X-ray study of the starting of a spreading crack by repeated application of load. Such a spreading crack is commonly though rather inaccurately called a "fatigue" crack.



Revised Representation Plan Wins by Large Majority in Corporation Plants

A REVISED employees' representation plan has been adopted by overwhelming majorities in plants of subsidiaries of the United States Steel Corpn. The plan will replace one which was introduced in Corporation plants last June. The revisions were the outcome of conferences among employee representatives and exchanges of views between those groups and representatives of the management.

The elections were called and held by the employees themselves and the results were certified by employee tellers. Majorities of all votes cast were returned for all plants except four. In the case of the Michigan Limestone & Chemical Co., 196 votes were in favor of the plan and 197 votes were against it, a margin of one vote. In the Duluth works of the American Steel & Wire Co., 395 ballots were favorable, 587 were unfavorable and 12 were spoiled. In one of the railroad divisions of the Tennessee Coal, Iron & Railroad Co., there was also a majority against the plan. In the Ambridge plant of the American Bridge Co., 570 ballots were favorable, 172 were unfavorable and 901 were spoiled. Hence there was neither a majority for nor against the revision. The high percentage of spoiled ballots is attributed to the activity of representatives of organized labor, who sought to confuse the vote rather than to permit a clear cut decision on the issue. Details of the votes at individual plants are given in the tables.

The revised plan was the outcome of experience under the original plan which, although producing gratifying results, disclosed certain features in its operation which both employees and management recognized as calling for correction. In the discussions which preceded the revision of the plan the employees almost invariably suggested provision of machinery for the recall of representatives and a guarantee of the permanence of the plan. The recall clause, as adopted, provides that a representative may be recalled by a two-thirds majority vote by secret ballot of the voters in his department or unit. The recall election is to take place only after a petition stating reasons for recall has been signed by two-thirds of the voters in the unit. The clause covering the duration of the plan binds the management to accept it in perpetuity but permits employees to terminate it by a majority vote at any annual election. The old plan specified that it would remain in force for the duration of the National Industrial Recovery Act and might be terminated thereafter by the management or a majority of employee representatives on three months' notice.

Employee representatives also made many suggestions for simplified procedure, which were adopted. The management stressed the need for the removal of all restrictions on eligibility for voting or holding office, believing that such a change was necessary to make the plan conform with the requirements of the National Industrial Recovery Act. Under the old plan eligibility for election as an employee representative was restricted to citizens, over 21 years of age, who had been in the service of the company at least one year, whereas voting was limited to workers with a record of at least 60 days' employment prior to the date fixed for nominations. Under the new plan, all restrictions on franchise are removed—a man who has just been hired can vote—and restrictions on eligibility to office are limited only to the proviso that company officials having the right to hire or discharge cannot be elected. If employees wish to choose a person outside of the organization as their representative they are privileged to do so.

Nothwithstanding the legal arguments for the removal of restrictions on eligibility to office and franchise, many employees were strongly opposed to this change and their attitude may explain some of the votes opposing the adoption of the revised plan.

Action on the new plan was obtained by employee representatives in the individual plants who sent out signed letters to the employees outlining the amendments suggested and recommending their adoption. In some cases letters were also sent to the employees by the management. These expressed no opinion either for or against the revised plan but indicated that the management was agreeable to the changes if the employees adopted them. Then elections were called which were handled entirely by the employees themselves. In most cases they were held on the last pay day in February, since a maximum number of employees would be at the works at that time. The selection of a pay day was commonly recommended by employee representatives because, with the staggered operations still in vogue in many plants, a considerable number of employees are absent on other days.

While the revised plan encourages cooperation between management and men, it in no way restricts the latter. Employees are given absolute freedom of voice and choice. They are empowered to negotiate with the management on wages, hours, working conditions and all other conditions affecting their employment. In case negotiations between employee representatives and the management fail to result in a satisfactory settlement, the dispute may be referred to arbitration. To insure each representative of his right of independent action, he is given the right to take up the question of alleged discrimination against him on account of his acts in his representative capacity with superior officers and a general joint committee of employee representatives and management, and may finally appeal to the State Department of Labor or the United States Secretary of Labor. The provisions covering arbitration of disputes and appeals on questions of discrimination against individual representatives were taken over substantially unchanged from the old plan.

The revised representation plan as generally adopted is reprinted below.

Revised Employee Representation Plan Of United States Steel Corpn. Plants

I.—REPRESENTATION

1. Representation shall range from one representative for each 100 employees in the small plants to one representative for each 300 employees in the larger plants.

Minimum number of representatives, 5.

Maximum number of representatives, 30.

Such adjustments as may be necessary to meet special cases shall be made.

2. For the purpose of applying the unit of representation, the plants should be subdivided according to departments and natural subdivisions. Wherever it is necessary to group a number of small departments in order to complete a unit of representation, regard shall be had to logical groupings and location.

3. Adjustment in units of representation shall be made in accordance with the recommendations of the committee on rules.

II.—TERMS OF REPRESENTATIVES

1. Representatives shall be elected for a term of one year, and shall be eligible for re-election.

2. A representative may be recalled by a two-thirds majority vote by secret ballot of the voters in his department or unit. Such election for recall shall be called by the committee on rules not sooner than 15 days nor later than 30 days following its approval of a petition signed by two-thirds of the voters in the unit of representation of the representative; said petition to state reasons for recall.

3. A representative shall be deemed to have vacated office upon his appointment to such a regular position as would bring him within the meaning of Paragraph 3, Section III, entitled: "Qualifications of Representatives and voters."

4. Vacancies in the office of representative may be filled, in the discretion of the committee on rules, by special elections conducted in the same manner as the general elections.

III.—QUALIFICATIONS OF REPRESENTATIVES AND VOTERS

1. There shall be no restriction or limitation in the choice of representatives (except as provided in paragraph 3, Section III).

2. All employees who are enrolled on the company's payrolls shall be entitled to vote.

3. Company officials and persons having the right to hire or discharge shall not be eligible as representatives or qualified to vote for representatives.

4. This plan shall in no way discriminate against any employee because of race, sex or creed, or abridge or conflict with his or her right to belong or not to belong to any lawful society, fraternity, union or other organization.

IV.—NOMINATIONS AND ELECTIONS

1. Nominations and elections shall be held annually.

2. Nominations shall be held on the second Monday and elections on the following Friday of the month selected. In the event of either of these days being a holiday, another day shall be selected by the committee on rules.

3. The total number of employees' representatives shall be chosen at each annual election.

4. The nominations and elections shall be conducted by the employees themselves, in accordance with these rules and regulations.

5. Nominations and elections shall be by secret ballot, and so conducted as to avoid undue influence or interference with voters in any manner whatsoever, and to prevent any fraud in the casting or counting of ballots.

6. On the day of nominations, each duly qualified voter shall be furnished with a ballot stating the number of persons for whom he is entitled to vote, on which he shall write the name of the person or persons whom he desires to nominate as representative or representatives of his department or unit.

7. A voter may place in nomination not more than the number of representatives to which his department, or unit, is entitled.

8. If on any ballot, the same name is placed in nomination more than once, it shall be counted but once.

9. Should the number of persons nominated on any ballot exceed the permitted number as stated on the ballot, the ballot shall be void.

10. There shall be two persons nominated for every person to be elected.

11. Those who have received the largest number of votes up to twice the number of representatives to be elected in the department or district shall be declared nominated, and shall be candidates for election.

12. On the day of elections, each duly qualified voter shall be furnished by the committee on rules with a ballot on which the names of the candidates shall be printed in the order of number of votes received at nominations. The voter shall indicate his preference by placing a cross (X) opposite the names of the candidates of his choice.

13. Candidates to the number of representatives to which a department or unit is entitled may be voted for, and this number shall be stated on the ballot. If this number is exceeded, the ballot shall be void.

14. Each voter shall deposit his own ballot in a box provided for the purpose by the committee on rules, and the ballots shall be counted under the direction and supervision

Result of Vote on Revised Plan of Employee Representation In Plants of United States Steel Corpn.

Carnegie Steel Co.

Works	Total Voting	Voting "Yes"	Voting "No"	Void	Per Cent of Vote Cast "Yes"	Per Cent of Vote Cast "No"
Homestead	6,674	4,298	2,092	284	64.40	31.30
Youngstown Dist.	4,708	2,952	1,630	126	62.70	34.62
Duquesne	2,846	1,854	748	244	65.14	26.28
Clairton	3,391	2,550	736	105	75.20	21.70
Edgar Thomson	3,065	1,705	1,076	284	55.63	35.10
Farrell	1,155	727	399	29	62.95	34.54
Mingo	1,095	806	194	95	73.61	17.72
Isabella and Lucy	309	242	63	4	78.32	20.39
River Trans.	242	194	47	1	80.17	19.42
Total	23,485	15,328	6,985	1,172	65.27	29.74

Tennessee Coal, Iron & Railroad Co.

Works	Total Vote Cast	Vote in Favor of Plan Number	Vote in Favor of Plan Per Cent	Vote Against Plan Number	Vote Against Plan Per Cent
Docena (Edgewater)	460	436	94.8	24	5.2
Central Water Works	264	262	99.2	2	0.8
Hamilton	474	402	84.8	72	15.2
Wylam	610	586	96.1	24	3.9
Coal Mines—Total	1,808	1,686	93.3	122	6.7
Bessemer Rolling Mills	312	295	94.5	17	5.5
Ensley Works	1,211	1,120	92.5	91	7.5
Fairfield Coke Works	333	292	87.7	41	12.3
Fairfield Sheet Mills	789	680	86.2	109	13.8
Fairfield Steel Works	1,454	1,177	81.0	277	19.0
Fairfield Wire Works	575	480	83.5	95	16.5
Steel and Coke Works Total	4,674	4,044	86.5	630	13.5
Ishkooda	192	184	95.8	8	4.2
Muscoda	129	125	96.9	4	3.1
Dolonah	57	51	89.5	6	10.5
Wenonah	227	217	95.6	10	4.4
Ore Mines and Quarries Total	605	577	95.4	28	4.6
Transportation Department—					
Trainmen Division	146	119	81.5	27	18.5
Shops and Main. of Way	376	154	41.0	222	59.0
Grand Total	7,609	6,580	86.5	1,029	13.5

American Sheet & Tin Plate Co.

Tin Mills	Total Vote Cast	Vote In Favor of Plan Number	Vote In Favor of Plan Per Cent	Vote Against Plan Number	Vote Against Plan Per Cent	Blank or Spoiled Ballots
American	1,278	1,144	89.5	125	9.8	9
Farrell	2,012	1,066	53.0	924	45.9	22
Gary Tin	3,324	1,802	54.2	1,077	32.4	445
Laughlin	1,518	1,113	73.3	392	25.8	13
National	1,491	810	54.3	655	43.9	26
New Castle	1,298	988	76.2	288	22.2	22
Sabraton	430	350	81.4	73	17.0	7
Shenango	2,681	1,915	71.4	741	27.6	25
Total Tin Mills	14,032	9,188	65.5	4,275	30.5	569
Sheet Mills						
Gary Sheet	2,409	1,397	58.0	858	35.6	154
Guernsey	578	503	87.0	75	13.0	...
Mercer	791	498	63.0	277	35.0	16
Vandergrift	2,680	1,464	54.6	660	24.7	556
Wood	836	455	54.4	365	43.7	16
Total Sheet Mills	7,294	4,317	59.2	2,235	30.6	742
Roll and Machine	258	201	77.9	52	20.2	5
Grand Total	21,584	13,706	63.5	6,562	30.4	1,316

National Tube Co.

Works	Total Vote Cast	Vote In Favor of Plan Number	Vote In Favor of Plan Per Cent	Vote Against Plan Number	Vote Against Plan Per Cent	Blank or Spoiled Ballots
National Works	5,089	3,194	62.8	1,663	32.7	232
Ellwood Works	1,932	1,433	74.2	407	21.1	92
Lorain Works	6,303	5,521	87.59	688	10.92	94
Total	13,334	10,148	76.16	2,758	20.70	418

American Steel & Wire Co.

Works	Total Vote Cast	Vote In Favor of Plan Number	Per Cent	Vote Against Plan Number	Per Cent	Blank or Spoiled Ballots
Newburgh Wire	1,148	1,018	88.7	124	10.8	6
American	707	585	82.7	113	16.0	9
Consolidated	728	611	83.9	105	14.4	12
Cuyahoga	2,740	1,831	66.8	877	32.0	32
North	1,191	899	75.5	276	23.2	16
South	2,167	1,836	84.7	310	14.3	21
New Haven	347	324	93.4	20	5.8	3
Trenton	303	262	86.5	41	13.5	0
Farrell	431	333	77.3	97	22.5	1
Donora Wire	1,384	869	62.3	485	35.1	30
Donora Steel	821	566	68.9	244	29.7	11
Donora Zinc	468	274	58.6	175	37.4	19
Rankin	360	218	60.6	124	34.4	18
Allentown	644	477	74.1	158	24.5	9
Waukegan	1,500	1,305	87.0	176	11.7	19
Anderson	279	218	78.1	56	20.1	5
DeKalb	507	401	79.1	103	20.3	3
Scott Street	273	192	70.3	78	28.6	3
Rockdale	317	227	71.6	81	25.6	9
Duluth	994	395	40.2	587	59.1	12
Total	17,309	12,841	74.2	4,230	24.4	238

Illinois Steel Co.

Works	Total Vote Cast	Vote In Favor of Plan Number	Per Cent	Vote Against Plan Number	Per Cent	Blank or Spoiled Ballots
Gary	8,231	4,279	53.1	3,372	40.9	584
South	6,639	4,270	64.3	2,311	34.8	58
Joliet	709	574	81.2	127	17.8	8
Total	15,579	9,122	58.5	5,800	37.2	651

American Bridge Co.

Works	Total Vote Cast	Vote In Favor of Plan Number	Per Cent	Vote Against Plan Number	Per Cent	Blank or Spoiled Ballots
Gary	513	342	66.66	82	15.98	89
Ambridge	1,643	570	34.69	172	10.47	901
Pencoyd	660	444	67.3	207	31.4	9
Total	2,816	1,356	48.15	461	16.37	999

Other Subsidiaries

Company	Total Vote Cast	Vote In Favor of Plan Number	Per Cent	Vote Against Plan Number	Per Cent	Blank or Spoiled Ballots
The Lorain Steel Co.	996	777	78.0	219	22.0	0
Mich. Limestone & Chemical Co.	393	196	49.9	197	50.1	0
Oliver Iron Mining Co.	4,368	3,180	72.8	1.088	24.9	100
Pittsburgh & Conneaut Dock Co.	162	105	65.0	49	35.0	8
Pennsylvania & Lake Erie Dock Co.	55	46	83.6	6	16.4	3
Pennsylvania Unit; Carnegie Natural Gas Co.	176	147	83.5	29	16.5	0
West Virginia Unit; Carnegie Natural Gas Co.	121	101	83.4	20	16.6	0
Universal Exploration Co.	...	149	...	31	...	...

of said committee. The candidates receiving the highest number of votes shall be declared elected.

15. In the event of a tie or a controversy arising concerning any nomination or election, it shall be referred to and decided by the committee on rules.

16. The committee on rules may make such provision as they may consider necessary for assisting any voter who may so request, in properly marking his ballot.

V.—MANAGEMENT'S REPRESENTATIVE

1. The company shall appoint a management's representative.

The management's representative shall keep the management in touch with the representatives, and represent the management in negotiations with the representatives, their officers and committees. He shall respond promptly to any request from representatives, and shall interview all of them, from time to time, with reference to matters of concern to employees.

2. The management of the works and the direction of the working forces, including the right to hire, suspend or discharge for proper cause, or transfer, and the right to relieve employees from duty because of lack of work, or for other legitimate reasons, is vested exclusively in the management; and, except as expressly provided herein, these rights shall not be abridged by anything contained herein.

VI.—COMMITTEES

1. After each annual election, the representatives shall immediately meet for the purpose of electing a chairman, secretary, a general committee, and committee on rules, and for selecting members of such other committees as are found necessary by the committee on rules for the consideration of the following subjects:

Rules.
Ways and Means.
Safety and Prevention of Accidents.
Economy and Waste Prevention
Wages, Piece Work, and Tonnage Rates.
Hours of Employment and Working Conditions.
Housing and Living Conditions.
Health and Works Sanitation.
Education and Publications.
Athletics and Recreation.
Continuity of Employment and Condition of Industry.

2. The general committee shall consider all matters not falling within the scope of any other committees herein provided for, and the chairman and secretary of the representatives shall be members of the general committee.

3. Each committee shall be composed of five members, and shall appoint its own chairman and secretary.

4. Vacancies on committees shall be filled at a regular meeting of the representatives.

5. Joint committees shall consist of the committees of the employees' representatives with the addition of representatives named by the management, who may equal but shall not exceed in number the employees' representatives.

6. The general committee of employees' representatives together with the general committee of management's representatives shall constitute the general joint committee on appeals.

7. The joint committees shall select their own officers and arrange their own procedure, subject to appeal, in case of controversy, to the joint committee on rules.

8. Wherever the word "committee" is used throughout this instrument, it shall mean the committee of employees' representatives unless a "joint committee" is specified.

VII.—COMMITTEE MEETINGS

1. Regular meetings of committees shall be held once a month.

2. On alternate months, the committees shall meet as joint committees.

3. Committees shall meet between the hours of three and five in the afternoon, unless otherwise arranged for on joint approval of the chairman of the employees' representatives and the management's representative.

4. Special meetings of committees and of joint committees may be held as occasion may require, on approval of the chairman of the employees' representatives and the management's representative.

5. For time necessarily lost by employees in actual attendance at regular meetings, or at special meetings of conferences jointly approved, representatives shall receive from the company payment commensurate with their average earnings.

6. Representatives shall have the right to appear before and be heard by a committee considering matters of concern to the employees of the department or unit they represent.

7. A committee, when concerned with matters of special interest to any particular department or class of employees, shall have the right of inviting into conference the representatives of the employees and of the management likely to be specially interested in such matters.

8. Any matter may be referred by the management through the management's representative to any committee or joint committee for consideration and report, and any matter may be presented by a committee or joint committee to the management through the management's representative.

9. The joint committee on rules shall arrange a suitable place for meetings of the representatives, and of the several committees and joint committees.

VIII.—CONFERENCES

A conference of employees' representatives of the plant or a conference of such employees' representatives and of representatives of management of the plant may be held from time to time as determined by the committee on rules or the joint committee on rules, as the case may be. At such conferences, negotiations may be carried on between the representatives of the employees and the representatives of the management on the subjects specified in Section VI, Paragraph 1.

IX.—PROCEDURE FOR ADJUSTMENTS

1. Any matter which, in the opinion of any employee, or any group of employees, requires adjustment, and which such employee, or group of employees, has been unable to adjust, either directly or through his or their representatives with the foreman of the work on which he or they are engaged, may be taken up by such employee, or group of employees, either in person or through any representative of his or their department in writing.

First—With the superintendent concerned.
Second—With the management's representative.
Third—With the management, who shall endeavor to effect a settlement, or who may with the approval of all the parties refer the matter to proper joint committee.

2. Unless a satisfactory disposition of any such matter has been effected within a reasonable time, any employee through his representative, or the management through the managements' representative, may require such matter to be referred to the general joint committee on appeals by a request in writing addressed to said committee, specifying in detail the matter requiring adjustment and the reasons which warrant its consideration by said committee.

The general joint committee on appeals shall consider any such matter with reasonable promptness, at a regular or special meeting, and may adopt such means as are necessary to ascertain the facts and effect a settlement.

3. If the general joint committee on appeals shall fail to effect a settlement, the matter shall be referred to the president of the company and the employees' representatives on the general joint committee on appeals for settlement. If the president of the company and the majority of the employees' representatives on the general joint committee on appeals shall fail to effect a satisfactory settlement, they may refer the matter to arbitration.

X.—GUARANTEEING THE INDEPENDENCE OF EMPLOYEES AND REPRESENTATIVES

It is understood and agreed that no employee will in any way be discriminated against for exercising any of his rights under this plan.

It is understood and agreed that each representative shall be free to discharge his duties in an independent manner, without fear that his individual relations with the company may be affected in the least degree by any action taken by him in good faith in his representative capacity.

To insure to each representative his right to such independent action, he shall have the right to take the question of an alleged personal discrimination against him, on account of his acts in his representative capacity, to any of the superior officers, to the general joint committee, and to the president of the company.

Having exercised this right in the consecutive order indicated and failing a satisfactory remedy within 30 days, a representative shall have the further right to appeal to the State Department of Labor or the Secretary of Labor of the United States. The company shall furnish the said State Department of Labor or the said Secretary with every facility for the determination of the facts, and the findings and recommendations of the said State Department of Labor or the said Secretary shall be final and binding.

XI.—AMENDMENTS

Any method of procedure hereunder may be amended at any time by two-thirds vote of the entire membership of the joint committee on rules, or by concurrent majority vote of the employees' representatives and of the representatives of the management at a meeting duly called and held for such purpose.

XII.—RIGHT OF TERMINATION

This plan shall be and remain in full force and effect unless and until terminated by a vote of the majority of the employees at any annual election.

Railroad Loans Being Hastened—PWA Activity is Stepped Up Generally

WASHINGTON, March 13. — Application has been made to the Interstate Commerce Commission by receivers for the Seaboard Air Line Railroad for authority to issue equipment trust certificates to secure a loan of $3,000,000 to $3,500,000 from the PWA to be used for the purchase of 1000 50-ton box and 100 phosphate cars and five locomotives.

The ICC has approved the application of the Baltimore & Ohio for a PWA loan of $1,500,000 to aid in the purchase of 35,000 tons of rails with the necessary fastenings and fixtures. The total cost of the material is estimated at $2,350,406.

The Boston & Maine has applied to the ICC for approval of a loan of $1,550,000 from the PWA for the purchase of 8000 tons of 100-lb. relaying and 85-lb. rails with necessary fastenings and accessories and for work in resurfacing, etc., and the purchase of signals.

The PWA has executed contract for a loan of $255,000 to the Kansas, Oklahoma & Gulf Railroad for the purchase of 5186 tons of rails, 178,500 tie plates, 8475 pairs of rail joints, 600 kegs of spikes, 380 kegs of track bolts and other requirements.

The Erie has been authorized by the PWA to use $623,000 of a previously made allotment of $11,964,000 for converting 750 drop-bottom gondola cars into self-clearing hopper cars. The work of converting the cars is to be done in the Erie's own shops. The allotment of $11,964,000 originally made to the Erie was to be used entirely for the purchase of 3775 new freight cars and 133 passenger cars. It was made on the basis of estimates of cost compiled by the Erie management. Since the allotment was made competitive bids have been obtained and contracts awarded for building all of the new equipment at a total cost of $11,282,000 or $682,000 less than the allotment. The action of the PWA enables the Erie to use $623,000 of that amount to convert the 750 cars.

A contract has been signed last Friday by the PWA for a loan of $331,000 to the Pittsburgh & West Virginia for the construction of three locomotives at the Eddystone, Pa., plant of the Baldwin Locomotive Works. At this plant also are being built 10 locomotives for the Northern Pacific on a PWA loan of $1,220,000 for which the contract was signed early in the year. The American Locomotive Co. is building 15 freight engines for the Nickel Plate at Schenectady, N. Y., and the Lima Locomotive Works is building five switching engines and 20 extra locomotive tenders for the Nickel Plate with a PWA loan.

Including the contract with the P. & W. Va., Administrator Ickes has placed under contract $150,702,000 of the $199,607,800 allotted for work creating loans to railroads.

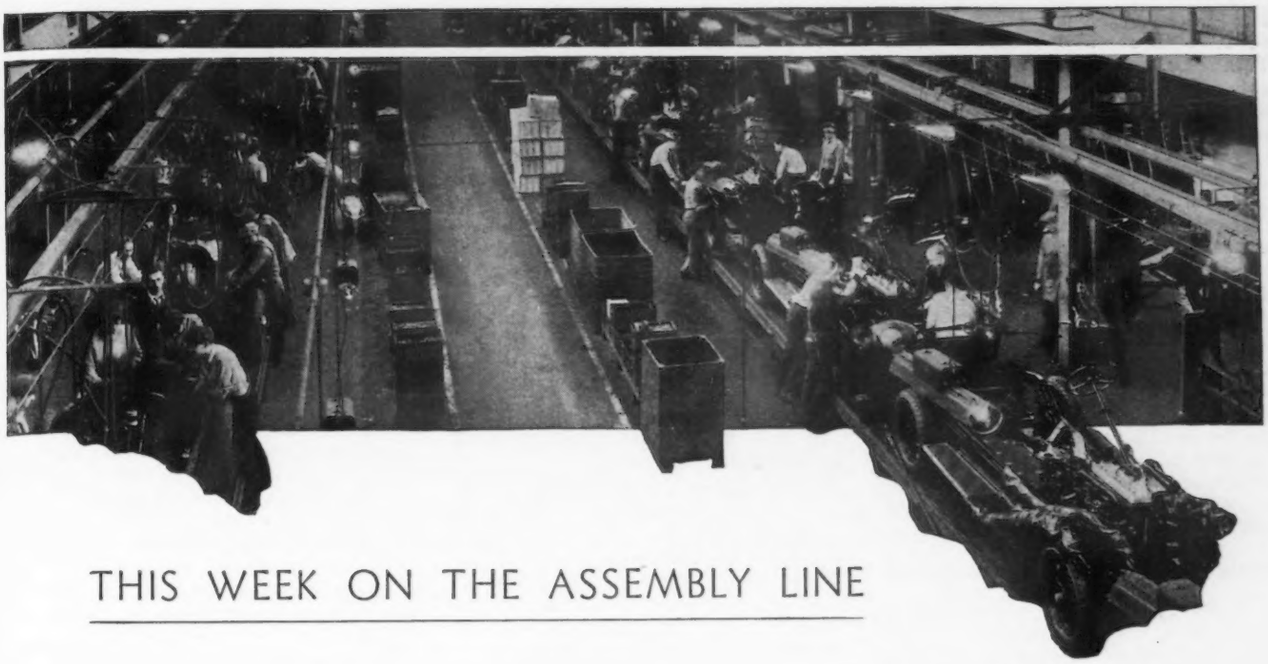
Housing Corporation Given Funds

Transfer to the Public Works Emergency Housing Corporation of $23,670,500 previously allotted to seven low-cost housing and slum clearance projects has been announced by Harold L. Ickes, Public Works Administrator. The housing corporation now has $123,670,500 available for housing and slum clearance projects. In order to make the transfer it was necessary to rescind housing allotments previously made.

Highway Contracts 75 Per Cent Awarded

More than 700 Federal aid highway projects, financed by a PWA allotment of $400,000,000, had been completed, and 3686 other road projects were under construction, according to latest reports received by Mr. Ickes from the United States Bureau of Public Roads.

The Administrator was informed that 6351 Federal aid highway projects in every State, estimated to cost $321,638,000, had been advertised for contract, begun by day labor employed directly by State highway authorities, or completed, as of March 3.



THIS WEEK ON THE ASSEMBLY LINE

Labor Situation Continues to Be All-Absorbing Topic at Detroit

DETROIT, March 13.

THE labor situation continues to be the all-absorbing topic in automotive circles, although the tension noticeable a week ago has eased somewhat. Detroit was convinced that it was to be the center of a strike of major proportions until President Roosevelt dramatically stepped on the scene with a promise to automobile workers that the National Labor Board itself would hear their grievances on March 14 in Washington and would see that justice was accorded them.

There is a general feeling of relief that the immediate strike threat has passed. Optimism is further engendered by the opinion in Detroit that a compromise will be effected between the industry and its employees and that, in any event, the Administration will take whatever steps are necessary to see that production of motor cars is not suspended. It is agreed in the local trade that labor is likely to be offered an increase in hourly rates as well as a readjustment of the group bonus system which lately has been found so objectionable.

On the other hand, it can be authoritatively stated that spokesmen for the industry will demand a guarantee that no attempt will be made for a stated period to disturb the terms of any agreement which should be made. Obviously manufacturers cannot function efficiently when they are constantly uncertain regarding cost of operations and other factors entering into production expenses. They have to know concrete conditions which must be met before they can devise ways and means of meeting them.

Equipment Buying Halts

The uncertainty as to wage increases and the request of NRA officials that maximum hours be lowered have brought equipment buying to a halt for the moment. The virtual stoppage of machine tool orders is expected to continue until motor car executives can make purchases with some assurance that their calculations will not be upset within a few hours. Unless the present situation is clarified quickly, the tooling program of one car maker, probably involving expenditures of $6,000,000 to $8,000,000, will be postponed instead of being carried out in April or early May as scheduled.

The estimate of February output made by the National Automobile Chamber of Commerce reveals that despite the high rate of employment in recent weeks assemblies have not been so great as Detroit believed. Members of the chamber turned out 170,206 units last month. Ford domestic production was 59,337 units, to which should be added about 5000 units for Ford of Canada. This gives a total of 234,543 units for the United States and Canada, as against an earlier estimated 270,000.

March Set at 325,000 Units

Although manufacturing difficulties have been smoothed out to a considerable extent, they still are bothering some companies more than they are willing to acknowledge. Ambitious programs have been laid out by all of the leading makers, but it now appears doubtful whether they will be realized this month. Unless there is a spurt in operations the latter part of March, the month will end with assemblies of not over 325,000 units. A week ago a mark of 350,000 seemed easily attainable.

Maintenance of an even and generous flow of parts into their plants is a continuing source of worry to the larger automobile companies. With insufficient capacity to meet current demand, the Chevrolet gear and axle plant has been compelled to let out forging work to a shop at Cleveland. Chrysler is understood to have given further work tc the Willys-Overland plant at Toledo, which is making stampings as well as connecting rods for Chrysler car divisions.

Incidentally, while strike fears may be entirely allayed by an agreement between automobile manufacturers and their employees, there remains the threat of an interruption of operations by labor trouble in plants of parts makers. The code of the automotive parts industry calls for a lower wage scale than the automobile code and rumblings of dissatisfaction are being heard from groups of workers. The only serious outbreak thus far was in Toledo two weeks ago when workers in four plants struck for several days, finally agreeing to return at a higher rate.

Dealers Finally Getting Stock

An analysis of production and sales for the first two months of the year shows that dealers finally are getting at least small stocks of cars. January assemblies totaled 167,910 units, and February is estimated at 234,543,

making the output in the first 60 days of 1934 about 402,453 units. R. L. Polk & Co. estimate January domestic sales of passenger cars and trucks at 83,700 units and February at 119,000, a total of 202,700 units. To this sum might be added 10,000 units representing Canadian sales, raising the final sales figure to 212,700 units. Thus production exceeded retail deliveries by almost 190,000 units, which would give each dealer about five cars for demonstration and display purposes.

It should be remembered that some companies are in much better position than others so far as deliveries are concerned, Ford leading the entire industry in this respect. In a few cases, notably Oldsmobile and the Airflow Chryslers and De Sotos, dealers' showrooms are lacking in current models, even in Detroit.

Sales War Over Knee-Action Wheels

A merry sales war is on between those cars with independent springing and those without it. Dealers handling cars with the conventional front axle are pointing out that knee-action wheels have been adopted hastily without sufficient experimentation, that many European cars do not have them because their makers are not convinced that they are desirable, that they have been developed in a short time merely as a sales expedient and that a car of proper design doesn't need them. Perhaps their most disconcerting thrust is at the Plymouth-De Soto dealer who is asked to answer the question: "Why independent front-end springing on the Plymouth and conventional leaf springs on the De Soto, which is supposed to be the last word in modern car designing?"

A story is being circulated to the effect that Chevrolet has turned out a large number of cars in the last month without knee-action wheels because knee-action units were not available. Even a switch back to the conventional front axle is hinted at. This inaccurate and confusing story probably arose out of a misunderstanding about what was going on at Chevrolet plants.

About 7500 of the 72,000 units made by Chevrolet in February were of the standard series with the conventional front end. The decision that these models should have the same type of axle this year as on all 1933 Chevrolets was made last fall and probably was inspired by the fact that the standard Chevrolet is a stripped car priced about $50 lower than the Master series and the expensive knee-action wheels were voted out as a matter of economy. The same is true of the standard, stripped Plymouth which retains the old method of springing.

The inference is incorrect that these standard models of both makers have the conventional front axle so as to offer an alternative to thousands of prospective buyers who are not yet convinced that they like knee-action wheels. The stripped cars are designed almost exclusively for the fleet trade which emphasizes economy above every other virtue. Although both Chevrolet and Plymouth hope to sell a considerably larger number of them than in 1933, the percentage compared with the Master series will be relatively small.

It is believed that the new small Buick is now planned for a public bow between April 15 and May 1. Equipment builders in some cases have not been able to make deliveries on specified dates and therefore machining lines will not be ready as early as hoped for.

A movement is being sponsored by at least one or two motor car companies to start the placing of tool and die work for 1935 models as early as June or July. The work would be let out in small quantities at a time so that by fall, when tool and die shops usually are working 24 hr. a day on rush orders, most of the dies would have been made. Two major advantages are claimed for this program—it would spread out work over a longer period, thereby stabilizing employment, and it would prevent labor from capitalizing on the necessities of the moment, as it did last fall, when production was tied up at the peak season.

Last Minute Changes Block Plan

However, one obstacle stands in the way of such a program. It seems inevitable that automobile engineers should get bright ideas at the eleventh hour, disrupting previous plans. Between June and October there is plenty of time for these engineers to shift their minds from one conclusion to another. This would be a costly procedure, if the major part of a tooling program had been completed and suddenly had to be junked. It is doubtful whether the habit of competitors in jockeying with each other for selling advantages would permit a stabilized, long-time tool and die program to be carried out successfully.

Foreign Sales Improve

Despite production delays, General Motors sold to dealers at home and abroad 163,354 units in January and February, compared with 141,731 in the same months a year ago. Its sales abroad last month totaled 11,195 units. It points out that recovery is world-wide, extending not only to its products made in the United States and Canada, but also to its Opel cars in Germany and the Vauxhall in England.

With Chrysler leading the industry in advanced streamlining and many observers predicting that all cars within a short time will be built somewhat along the lines of the present Airflow De Sotos and Chryslers, unusual interest is attached to a statement made the past week by Alfred P. Sloan, Jr., president of General Motors Corpn. "Streamlining," he said, "does not offer any substantial economies in first cost nor in operating cost. It might be assumed that weight and cost would be reduced through the possibility of a smaller power plant for the streamlined object. However, in a modern motor car, the ability to accelerate rapidly, or quick 'pick-up,' is an important consideration, and the power required to accelerate is largely independant of the shape of the object. If we were willing to accept an important decrease in the ability to accelerate, there would be some gain in economy and a smaller power plant would become possible, but the saving in chassis first cost would probably be largely offset by the increased cost and weight of the streamline design of the body. Thus the most that can be expected in efficiency under present conditions is a slightly higher maximum speed, all other conditions being the same."

Great Lakes Steel Corpn., operating all eight open-hearth furnaces, is taking not only all the hot metal from the two Hanna blast furnaces at Zug Island, but also is using cold pig in its charge, drawing on Hanna's yard stocks for this purpose. Pig iron shipments to automotive users this month are running 50 per cent better than in February. The Chevrolet gray iron foundry at Saginaw is melting about 1600 tons of iron a day and the Buick foundry about 600 tons. Campbell, Wyant & Cannon at Muskegon is reported operating at a high rate, part of its work consisting of 800 V-eight cylinder blocks a day for Ford and cast camshafts for Hudson-Terraplane.

Varying Reports on Steel Buying

Varying reports come from the local steel trade as to bookings the past week. In some cases the tonnage this month is running ahead of February's average and in others, particularly in flat-rolled products, there has been a temporary lull in buying. Fisher Body has bought considerable steel in the last ten days, and heavy releases are expected in the next week from practically all General Motors divisions, including Chevrolet's gear and axle plant at Detroit and its manufacturing plant at Flint.

Hot-rolled pickled in the breakdown deoxidized sheets, first developed for the Ford Motor Co.'s use and sometimes called Fordsteel, are now being ordered in a few instances by stove makers, and experimental lots have been placed with mills by automobile companies other than Ford. This is the first time that orders for this grade have been solicited outside the Ford company, which was the only user for months. Apparently it is the intention of some mills making this material to broaden the market for it.

Threat of Labor Difficulties Checks Demand from Motor Car Industry

Caution Also Noticeable in Other Consuming Lines, But Tin Plate Output Makes Further Gain and Railroad Releases Are Heavier

MIXED tendencies in steel production and in scrap prices indicate a leveling off of the upward surge of activity that got under way in the latter part of January. Demand from the automobile industry has been checked by fear of labor troubles, and evidences of increased caution are seen in a number of miscellaneous consuming lines. Among exceptions may be noted the farm equipment industry, which has increased its output to 40 per cent of capacity, and container manufacturers, who are now engaging 80 per cent of the tin plate capacity of the country, as compared with 75 per cent a week ago. In general, however, the present lack of trend in the steel industry is explained by opposing tendencies in two leading consuming lines—the temporary shrinkage of automotive requirements and the steady growth of railroad needs.

Ingot output has risen one point to 31 per cent of capacity at Pittsburgh and three points to 33 per cent of capacity in the Philadelphia district, largely because of heavier railroad releases. More tonnage from the carriers has also reached Chicago producers, but not in sufficient volume to prevent a two-point drop in operations to 49 per cent of capacity. Among districts specializing in the lighter rolled steel products, Detroit and Cleveland continue to operate at 100 and 69 per cent respectively, but the Valley rate has receded from 55 to 52 per cent and the Wheeling average from 80 to 75 per cent.

The national average of ingot production has dipped to 48½ per cent of capacity, from 49 per cent a week ago.

WEAKNESS in scrap has developed both because of uncertainty in the automobile outlook and a better flow of material following the subsidence of severe weather. The scrap market is weak at Detroit and Cleveland and has commenced to give ground at Pittsburgh, where heavy melting grade is off 25c. a ton. Chicago prices, however, are strong, with steel scrap up 50c. a ton. THE IRON AGE composite price for heavy melting scrap, representing an average of Chicago, Pittsburgh and Philadelphia prices, has advanced slightly from $12.92 to $13 a gross ton.

Part of the current reaction in iron and steel demand is attributable to the failure of prices to advance for the second quarter. In some cases, consumers no longer intend to specify fully against expiring first quarter contracts.

BUT few in the trade doubt that the market would recover its lost buoyancy if the threat of grave labor difficulties were removed. Throughout industry there is a general disposition to accede to all demands of labor that are consistent with practical plant operations and do not threaten to stifle business at the source, but there is almost universal opposition to union recognition. The automobile industry, for example, is prepared to increase wages, simplify its bonus systems for the payment of production workers and possibly further reduce the working week, if organized groups of employees give up their insistence on the closed shop. Similarly the steel industry seems disposed to follow the President's suggestion that wage rates be raised and might agree to an advance of as much as 10 per cent, provided that prices might be raised sufficiently to cover the increase in cost. Further shortening of hours in the steel industry is not a practical possibility, since the average work week per employee during operations under the code has been only 29.2 hr.

The possibility of a wage advance is already being taken into consideration by pig iron producers, particularly in the East, who talk of raising their prices in anticipation of such a contingency. It is unlikely, however, that there will be general advances in the industry until action on wages has been taken.

SEVERAL thousand tons of plates for cars bought by the Van Sweringen lines have been ordered and other tonnages for this equipment will probably be placed shortly. The Milwaukee and the Illinois Central have closed for a total of about 50,000 tons of rails, the Wabash has bought 10,000 tons, the Missouri-Kansas-Texas has ordered 4700 tons, while the Seaboard Air Line has purchased 11,200 tons of rails and 2000 tons of fastenings. The New York Central will take bids March 20 on 40,000 tons of rails, and the Baltimore & Ohio has asked for a PWA loan to finance orders for 35,000 tons. The Seaboard Air Line has applied for Government money to buy 1100 freight cars and five locomotives.

Structural steel awards, at 13,500 tons, compare with 21,800 tons a week ago. New projects total 12,600 tons compared with 13,000 tons last week.

Iron and steel exports in January were 178,023 tons compared with 184,585 tons in December. The decline, however, was more than covered by a decrease in scrap shipments.

Prices of bolts, nuts and rivets have been reaffirmed for the second quarter. Low phosphorus pig iron has been reduced from $23 to $19 a ton, f.o.b. Tennessee furnace, effective March 17. THE IRON AGE composite prices on pig iron and finished steel are unchanged at $16.90 a ton and 2.028c. a lb. respectively.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Mar. 13, 1934	Mar. 6, 1934	Feb. 13, 1934	Mar. 14, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.26	$19.26	$19.26	$13.34
No. 2, Valley furnace	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti	18.13	18.13	18.13	13.82
No. 2, Birmingham†	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.	18.76	18.76	18.76	13.50
Basic, Valley furnace	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	16.89
Malleable, Chicago*	17.50	17.50	17.50	15.50
Malleable, Valley	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago	23.54	23.54	23.54	23.17
Ferromanganese, seab'd carlots	85.00	85.00	85.00	68.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh	36.00	36.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.60
Bars, Chicago	1.80	1.80	1.80	1.70
Bars, Cleveland	1.80	1.80	1.80	1.65
Bars, New York	2.08	2.08	2.08	1.95
Plates, Pittsburgh	1.70	1.70	1.70	1.60
Plates, Chicago	1.75	1.75	1.75	1.70
Plates, New York	1.98	1.98	1.98	1.648
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago	1.75	1.75	1.75	1.70
Structural shapes, New York	1.95¼	1.95¼	1.95¼	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	1.75	1.75	1.75	1.45
Cold-rolled strips, Pittsburgh	2.40	2.40	2.40	1.80

Finished Steel

	Mar. 13, 1934	Mar. 6, 1934	Feb. 13, 1934	Mar. 14, 1933
Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.25	2.00
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.10
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.70
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.40
Hot-rolled sheets, No. 10, Chicago dist. mill	1.85	1.85	1.85	1.50
Wire nails, Pittsburgh	2.35	2.35	2.35	1.85
Wire nails, Chicago dist. mill	2.40	2.40	2.40	1.90
Plain wire, Pittsburgh	2.20	2.20	2.20	2.10
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.15
Barbed wire, galv., Pittsburgh	2.85	2.85	2.85	2.35
Barbed wire, galv., Chicago dist. mill	2.90	2.90	2.90	2.40
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$14.50*	$14.75	$13.75	$8.75
Heavy melting steel, Phila	12.00	12.00	11.75	6.75
Heavy melting steel, Ch'go	**12.50**	12.00	10.75	5.25
Carwheels, Chicago	12.25	12.25	11.25	8.00
Carwheels, Philadelphia	**13.00**	12.75	12.75	8.00
No. 1 cast, Pittsburgh	13.75	13.75	12.25	9.00
No. 1 cast, Philadelphia	**13.25**	12.50	12.50	8.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	6.25
No. 1 RR. wrot., Phila	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go (net)	9.50	9.50	9.25	4.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.50	$1.75
Foundry coke, prompt	4.25	4.25	4.25	2.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.75	7.75	5.50
Lake copper, New York	8.00	8.00	8.00	5.75
Tin (Straits), New York	**54.35**	52.62½	51.65	24.12½
Zinc, East St. Louis	*4.37½*	4.40	4.40	3.20
Zinc, New York	*4.72½*	4.75	4.75	3.57
Lead, St. Louis	3.90	3.90	3.90	3.22½
Lead, New York	4.00	4.00	4.00	3.35
Antimony (Asiatic), N. Y.	**7.50**	7.30	7.15	6.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
March 13, 1934	2.028c. a Lb.	$16.90 a Gross Ton	$13.00 a Gross Ton
One week ago	2.028c.	16.90	12.92
One month ago	2.028c.	16.90	12.08
One year ago	1.923c.	13.56	6.92
	Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	2.036c., Oct. 3;	1.867c., Apr. 18	$16.90, Dec. 5;	$13.56, Jan. 3	$12.25, Aug. 8;	$6.75, Jan. 3
1932	1.977c., Oct. 4;	1.926c., Feb. 2	14.81, Jan. 5;	13.56, Dec. 6	8.50, Jan. 12;	6.42, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Steel Demand Levels Off In Pittsburgh District

Pittsburgh Ingot Rate Rises One Point to 31 Per Cent, But Operations Recede in Valley and Wheeling Areas—Scrap Lower

PITTSBURGH, March 13.—Steel demand has leveled off with the approach of second quarter. While most producers' books are open for business in the coming quarter, consumer interest in forward delivery is not evident. Except in the case of some grades of sheets, particularly for automotive consumption, specifications are being restricted to delivery through March.

Uncertainty surrounding labor problems is undoubtedly the chief obstacle to renewed buying at the moment.

Tin plate, strip and tin mills, however, are maintaining or bettering recent operating schedules. Average production for the tin plate group has advanced to 80 per cent of capacity as a result of increased schedules at certain large units. Sheet mill output has held at better than 60 per cent, while strip mills are still occupied at close to the same rate.

Practically all steel prices are automatically quotable for second quarter shipment. Temporary relief from the possibility of higher quotations undoubtedly is another deterrent to forward contracting.

The heavy hot-rolled department has not yet experienced a notable increase in releases, although the local rail mill will be occupied several days this week on a small release of steel rails against the 42,000-ton Pennsylvania order. Structural and plate awards in the past week offered little immediate support to operations. New inquiries for these products likewise were small.

As a result of heavier schedules in tin plate mills and scattered improvement in other departments, ingot output in the Pittsburgh district has crept ahead one point to 31 per cent of capacity. Output in the Valleys has tapered off to 52 per cent, while production in the Wheeling district has fallen off to 75 per cent.

No. 1 heavy melting steel scrap at Pittsburgh is 25c. a ton lower at $14.25 to $14.75.

Pig Iron

General demand has not improved. Foundry and malleable users have not yet begun to derive benefits from orders for railroad castings, and are consequently gaging pig iron purchases very cautiously. Large-lot consumers are still withholding interest from the open market. Although some activity in basic is considered to be an early possibility, no specific inquiries for this grade are current.

Semi-Finished Steel

Activity in this market is sustained chiefly by a fairly substantial movement to non-integrated tin plate, sheet and strip mills, with tin plate mills leading in current takings. With prospects for higher prices somewhat obscure at the moment, interest in second quarter is rather meager. Wire rods are still depressed by lagging operations at most wire mills.

Bolts, Nuts and Rivets

Makers yesterday opened their books for second quarter business at unchanged quotations of 70 per cent off list for bolts and nuts, 70 and 10 for small rivets, and $2.75 a 100 lb. for large rivets. Demand is holding its own, with gradual improvement expected to follow prospective release of additional orders for railroad equipment. The building of Government ships is accounting for a fair share of current demand.

Rails and Track Accessories

The New York Central has renewed its inquiry for approximately 40,000 tons of steel rails, and a substantial tonnage of companion fastenings. Bids on this material will be closed on March 20. Prospective rail and fastenings requirements of the Baltimore & Ohio have not yet been made definite, but early issuance of specific inquiries is expected. Miscellaneous railroad requirements are holding up fairly well. The local rail mill has received release of a small portion of the 42,000 tons of rails on order for the Pennsylvania Railroad, and will be engaged probably for the greater part of the current week. Release of additional Pennsylvania tonnage is momentarily very indefinite.

Bars

Although demand is holding its own, volume of current business is far from encouraging. In practically no case can demand for bars be termed significant from a tonnage standpoint. The automotive industry continues to be the chief outlet, principally for alloy bars. Interest from agricultural implement manufacturers is beginning to stir. Current prices are now generally applicable to second quarter, but very little interest in forward tonnage can be recorded.

With the exception of the placing of approximately 500 tons for the Montgomery Island dam near Pittsburgh, the reinforcing bar market is bare of immediate activity. No change in the current base price at Pittsburgh is noted for second quarter.

Cold-Finished Steel Bars

Demand continues to be irregular. In some cases, shipments have diminished slightly since a week ago. Automobile manufacturers have not been specifying to the limit of current commitments, and jobbers are apparently well covered ahead. Second quarter tonnage now is generally available at 2.10c., Pittsburgh base.

Plates and Shapes

Although no important plate tonnage has been recently reported in this district, the market is still buoyed up by prospects of large placements in the offing. Car building programs of several railroads are showing definite progress, and plate producers look for orders from that source within the next month or two. Other consuming factors are not contributing much activity at present.

The structural market is rather quiet. New inquiry during the week was of a minor character, with 2600 tons for a bridge in Florida the outstanding item. Awards likewise are small, with no major tonnage reported.

Tubular Goods

Movement of standard pipe has been further hampered by recent severe weather. Oil country goods continue to be in fair demand, with prospects for early improvement very favorable. A slight improvement in calls for boiler tubes is noticeable.

Wire Products

Demand for manufacturers' wire is far from brisk. Specifications from the jobbing trade are likewise light. Business from the agricultural areas is still in the offing, while the movement of road mesh has further abated as a result of continued inclement weather. Current prices are fairly well established for second quarter, but contracting for that period is practically nil.

Sheets

Sheet mills continue to operate at slightly better than 60 per cent of capacity. Some makers report that a decline from that rate is likely soon unless fresh specifications appear. The current tendency is toward smaller

volume. The automotive industry is still the most active taker of sheets, with miscellaneous users lagging considerably behind. Small consumers are taking a fair quantity of spot shipments, while some buyers are covering moderately for second quarter. All current prices are applicable to second quarter delivery.

Tin Plate

Scattered improvement in specifications is reported by some independent makers. Current bookings are considered sufficient to carry the present average operating rate for the tin plate group of 80 per cent for at least two or three weeks. A leading independent has stepped up production to 80 per cent, while the largest maker is still engaged at around 85 per cent.

Strip Steel

Fairly well sustained specifications from the automobile manufacturers are enabling strip mills to maintain the recent operating rate of 60 per cent. Miscellaneous orders are also holding their own, although forward interest has noticeably subsided since the recent readjustment in prices. Current quotations are now generally quotable for second quarter.

Coal and Coke

Consumers of domestic heating coke covered freely during the latest spell of freezing weather, and as a result shippers have fallen 10 days behind on deliveries. A good share of these contingency orders, however, will likely be canceled as soon as the weather improves. Foundry coke is still fairly active. Standard brands of Connellsville furnace coke are maintained at $3.50, and foundry grades at $4.25, ovens. Premium brands of Connellsville foundry coke are holding at $5, ovens. Very little activity in the bituminous coal market is noticeable. Demand for slack is particularly drab. The approach to the contracting period on April 1 is somewhat muddled by uncertain producing costs faced by producers, pending proposed Federal legislation on reduced hours and increased wages for labor.

Scrap

Mills have generally withdrawn interest in forward offerings of most grades of scrap, and the market has temporarily halted in its recent upward trend. A fairly sizable sale of No. 1 heavy melting steel at $14.50, delivered, last week has established this grade at 25c. below the previous quotation. Some of the recent buoyancy caused by a comparative shortage of scrap in nearby districts has subsided with the disappearance of severe weather. Shipments in the Youngstown district have been considerably curtailed. No. 1 steel sold on the recent Pennsylvania Railroad list is reported to have netted a consumer price of $15, delivered. The remainder of the scrap list is apparently holding at recent levels, and little fluctuation is expected before the close of the month.

Additional Rail Tonnage Booked in South

BIRMINGHAM, March 13. — With more than 40,000 tons of railroad business booked in the last several weeks, the Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. has a large enough backlog to insure a continuance of operations for at least two more months. Last week announcement was made of an order by the Seaboard Air Line for 11,200 tons of rails and 2000 tons of fastenings, delivery to be started in May. This was the third large order in recent weeks, the others having been 10,000 tons from the Southern and 20,000 tons from the St. Louis-San Francisco.

Bookings in plates and structural tonnage were light last week, as were those in wire products and sheets. Jobbers furnished most of the demand.

Virginia Bridge & Iron Co. has received an order for 1000 tons of structural material from the Illinois Central, for the construction of a bridge at Bonne Carre, La. This steel will be fabricated at the company's Memphis plant.

Inquiries have been sent out for steel requirements on the proposed project of the Tennessee Valley Authority at Town Creek, Ala., which will amount to about 2600 tons.

Seaboard Air Line is expected to buy 1000 box cars and 100 cars for transporting phospate rock, dependent on the disposal of equipment trust certificates to the PWA. The Central of Georgia has not yet taken any action on its proposed purchase of 200 70-ton coal cars, which has been pending for more than two months. The Bessemer plant of the Pullman Car & Mfg. Corpn., closed for over two years, is making a strong bid for some of this business.

Thirteen open-hearths have been operating since March 1 and the same number will be worked this week. This is an increase of one over the total worked between the middle of December and March 1, and also is the highest number since August.

Pig Iron

Pig iron buying is dragging, as foundries are not yet ready to give much consideration to second quarter requirements. For the current melt, they are drawing mostly on the large stocks that were assembled last quarter. There is a little interest in second quarter tonnage and a few small contracts have been placed. Current shipments are slightly ahead of those for the same period in February.

New pressure pipe tonnage last week was again small. There were several bid openings but no awards. American Cast Iron Pipe Co. and National Cast Iron Pipe Co. were low bidders on about 200 tons at St. Louis. United States Pipe & Foundry Co. was low on 700 tons at Council Bluffs, Iowa. Morgan Hill, Cal., opened bids on a project that will require about 300 tons.

The scrap situation is still in a passive state. No. 1 cast is moving a little better than several weeks ago, but the steel grades are dull.

Blast furnace operations remain unchanged, with 10 stacks active.

The strike in the Alabama coal fields, which has been brewing for several weeks and which began to spread rapidly last week, has not yet affected the furnace companies, but there is some apprehension that it will, unless the movement is checked.

Rails Distributed by St. Louis Road

ST. LOUIS, March 13.—It is understood that the allocation of the 4700 tons of 112-lb. rails purchased by the Missouri-Kansas-Texas was as follows: 2500 tons to Illinois Steel Co., and 1100 tons each to Inland Steel Co. and Colorado Fuel & Iron Co. The rails are to be laid near McAlester, Okla.

First quarter prices on structural shapes, plates and sheets have been reaffirmed for second quarter. The effect has been to slow up specifications.

All bids have been rejected for a bridge at Omaha, Neb., requiring 3875 tons of structural steel. The Kansas City Bridge Co. was the low bidder. No date has been set for the receipt of new bids. The Illinois Highway Commission will open bids today for projects requiring 400 tons of structural steel.

The advances in scrap prices have been checked by a freer movement of material from the country and from the railroads, 13,000 tons being offered by three lines this week: St. Louis-San Francisco, 6000 tons; Missouri Pacific, 5000 tons, and Missouri-Kansas-Texas, 2000 tons. Embargoes by Ohio River markets also are restricting the movement of scrap from this market. Prices are unchanged.

Only a fair amount of pig iron is being sold, although the melt in the district is being maintained at a high rate. Indications are that the Commonwealth plant of the General Steel Castings Co. will be started up about April 1.

Steel Output Off Two Points in Chicago District

Labor Troubles Cut Down Shipments to Automobile Industry — Pig Iron Movement Gains — Scrap Higher

CHICAGO, March 13.—Ingot output has dropped two points to 49 per cent of capacity, in spite of heavier production of rails and track fastenings. The situation, insofar as the metal-working industry is concerned, is illustrated by the movement of bar mill products, which for the first time in many weeks have failed to show a gain.

The impression is gaining ground here that automobile manufacturers are at or very near the peak of production of the current run. However, this impression may be due in part to the fact that labor troubles have not only cut shipments to some automobile plants, but industry as a whole is worried and as a natural consequence is leaning decidedly to the cautious side. On the other hand, farm implement manufacturers, influenced by the distribution of process taxes and prices for farm products, continue aggressively to step up output.

Taken as a whole, the market seems to have reached a resting point in its upward climb. Finished steel sales and specifications have leveled off and forward contracting, with the exception of pig iron, is making very slow progress.

Pig Iron

A significant development in this market is the fact that not only are total sales for the second quarter running ahead of commitments for the first quarter but individual purchases are larger. The flow of shipments of Northern iron is steady, and releases now at hand indicate that the March movement will top February by not less than 30 per cent. A Federal furnace which was to have been in by mid-March will actually be lighted near the 25th of the month.

Reinforcing Bars

The one bright spot in this market is a growing demand for small tonnages. An increasing proportion of these are for private undertakings, among them are several building alteration projects. Cook County, Ill., is taking bids on a 350-ton bridge at Riverdale and plans for other similar projects are taking shape. Shipments of road bars will soon get under way, some dealers estimating that the movement will begin about the first of April. Engineering fees are being revised under the code. The new graduated scale, which is, in general, lower than the old scale, applies to lots of 100 tons or more.

Cast Iron Pipe

This market is without feature except for the one point that sellers have fair books against which releases are exceedingly slow. Public buying, that is exclusive of CWA projects, is moderately improved. Cold weather still prevails throughout most of the Central West and frost is slow in coming out of the ground. Prices for 6-in. and larger pipe are firm at $44 to $45 a ton, delivered Chicago.

Rails and Track Supplies

Western railroads have closed for about 60,000 tons of rails in the last few days. These orders were placed by the Milwaukee Road, the Illinois Central and the Wabash. The last named railroad having placed 6850 tons with Illinois Steel Co. and 3150 tons with Inland Steel Co. All told about 55 per cent of these recent purchases came to Chicago mills. Rail mill schedules are being increased and a heavier flow of accessory business is also recorded.

Plates

Prospects for added railroad equipment orders are better following the announcement that the Baltimore & Ohio will seek Government money for the purpose of building 820 gondola cars, repairing 5000 freight cars and reconditioning 240 locomotives. It is also probable that the Illinois Central will soon get to its equipment repair program. No word has reached Chicago as to distribution of steel for the Van Sweringen cars. Though this news is expected momentarily. On the whole, plate business remains quiet. Shops are making a few inquiries, but the tonnages involved are small. Several old brewery inquiries are still before the trade, but these are far from being actually alive. A lock at Delhi, Ohio, on the Ohio River will take close to 300 tons of materials, mostly plates.

Bars

Shipments of bar mill products have failed to gain for the first time in many weeks. There is growing conviction that automobile plants are close to, if not at, their peak production for the current run. However, this may be of less moment than the caution shown by automobile manufacturers, who at almost every turn are again threatened with labor troubles. The situation at the Nash plants remains a deadlock. Farm machinery producers have now reached an average output of 40 per cent of capacity, with some departments near capacity.

Sheets

Automobile manufacturers are striking a fast pace in placing second quarter contracts, but other users of sheets show little interest in forward commitments. Shelving and container manufacturers have well balanced schedules that are of good size. The roofing trade, which should have been well started on manufacturing for spring delivery several weeks ago, has not yet gotten under way.

Structural Material

Awards of 2000 tons include only 300 tons of private work. All the remainder being for State highway bridges. Strictly fresh inquiries total 5000 tons, included in which are 1700 tons for department store additions at Chicago and at Indianapolis. Highway bridges of various types account for most inquiries, though at Beloit, Wis., 500 tons will be used for a new high school building.

Wire Products

Shipments have again started upward but the gain has not yet been sufficient to bring output of wire and products in line with production of heavy rolled steel products. Business in the South is particularly good, and prospects in the central part of the country are said to be good. It is too early to get a line on the Northwest, which is still handicapped by winter weather.

Hot-Rolled Strip

Demand remains steady and local producers are well engaged. In returning to the price of 1.85c. a lb., Chicago, sellers passed by the option of giving ten days' notice, thereby putting the new prices into effect at the time of filing.

Scrap

Heavy melting steel prices continue to move upward. The new high being $12.75 a gross ton, delivered consumers' yards. Not less than 40,000 tons has changed hands in the last few days. The new prices are strong and numerous dealers believe the top has not been reached. More scrap is moving in from the country, attracted by the high prices. However, it can scarcely be said that Chicago's needs are being well taken care of, because this district is being forced to share supplies with the Pittsburgh district, which is reaching as far west as Kansas and Oklahoma.

Finished Steel Orders Fail To Improve In New York

Tin Plate Releases Anticipate Labor Troubles—Demand for Carbon Bars Slightly Stronger — New York Central Again Inquires for Rails and Accessories

NEW YORK, March 13.—Reports on finished steel business in this district during the last week have not been particularly encouraging. An increase in demand for merchant bars has been registered and tin plate bookings continue heavier, indicating a desire on the part of consumers to anticipate labor troubles in the industry. However, demand for sheets and strip steel is tapering off and many consumers apparently are not intending to specify fully against their contracts now on mill books. Such obligation would naturally be canceled on March 31 and new contracts taken in their place.

The New York Central will take bids March 20 on 40,000 tons of rails, 1,750,000 tie plates, 30,000 kegs of spikes and 7000 to 8000 kegs of track plates. The New York, Ontario & Western has inquired for 200,000 tons of tie plates and the Bangor & Aroostook has purchased 750 tons of tie plates. The Boston & Maine is expected to inquire soon for a substantial quantity of steel for car repair purposes.

Structural steel demand in the metropolitan area continues to lag, with weather conditions largely responsible. A number of PWA projects are now reported to be ready to go ahead as soon as weather permits. Standard pipe is very dull, apparently for the same reason, and jobbers' stocks are more than ample to meet immediate needs.

The prospect of increased costs in the steel industry occasioned by increased wages and shortened working hours has revived talk of advances in finished steel prices. However, any changes made now would probably affect little tonnage before the third quarter.

Pig Iron

The appearance of this market is unaltered as compared with preceding weeks. New inquiries in the New England territory total over 3000 tons, but interest in this district continues to be of a carload nature. Several sellers succeeded in booking tonnages which have been accumulating for several weeks, and aggregate sales for the week were 2500 tons, compared with 1300 tons in the preceding period, and 1400 tons booked a fortnight ago. There is a perceptible improvement in melt of both integrated and jobbing foundries, but the current large yard stocks and the certainty of second quarter quotations are discouraging active consumer interest in large commitments. After March 17 low phosphorus iron will be based $4 a ton lower at $19, Johnson City, Tenn., but the change has little import as that furnace is inactive.

Reinforcing Steel

Specifications were exceptionally light during the past week, and awards aggregated less than 1000 tons for miscellaneous highway projects in New Jersey, Connecticut and Pennsylvania. Additional New Jersey awards are expected by the end of March, and Pennsylvania is opening bids each week. No announcement has yet been made concerning the 2000 tons of bars and mesh required by the midtown tunnel, New York.

Scrap

This buying market continues strong in tone with interest centered in a possible change in domestic sentiment. Brokers are exporting on old contracts, but during the week practically no new foreign business was placed because of the difficulty of securing firm bids commensurable to domestic prices. Much of the present local activity is a reflection of Bethlehem's active demands for important grades. No. 1 and No. 2 heavy melting steel are being loaded on canal barges here for future shipment to Buffalo, and No. 2 cast is being bought at $7.50 a ton, also for Buffalo delivery. No. 1 machinery cast is strong at $8.50, barge, for melting at Bridgeport, Conn., and Phillipsburg, N. J., and heavy breakable cast is firm at $8 a ton on the strength of recent purchases at $11.75, delivered Harrisburg, Pa.

Miscellaneous Business Gains at Cincinnati

CINCINNATI, March 13. — Heavy ordering from widely scattered sources is sustaining sheet demand at close to 70 per cent of capacity. Automotive releases continue in steady volume, but manufacturers are restricting advance requirements to two-week periods. This curtailment of advance releases is largely due to labor uncertainties in the automotive field. The household appliance manufacturers have revived purchasing at a high rate; in fact, district mill operators indicate that demand from this source is on a parity with automotive ordering. Light-gage departments of the leading district interest are running at full capacity, but heavy-gage mills still have a margin between operations and possible capacity. Jobbing interests are increasing purchases steadily.

Pig Iron

With foundry operations spotty, demand for pig iron has eased, with bookings totaling only 300 tons. Inquiry is lacking, although consumers are reported to be carrying rather small inventories.

Coke

No formal announcement of coke delivery prices has been made under new freight rate schedules. Oven interests are withholding lists until the last moment. In some quarters the opinion is ventured that the new tariffs may be suspended at the last moment, although no tangible basis for this opinion appears.

Warehousing Business

Jobbers report a steady, but unspectacular, improvement in industrial demand. February business exceeded January of this year as well as February, 1933, and current business appears at a better rate than last month.

Scrap

Embargoes on shipments into the Valleys have softened the local market temporarily. Sheet clippings, however, have been bid up 50c. Yard supplies are still ample, but dealers are holding for higher prices.

Specifications for alloys sheets, strips and plates are to be drawn up by the American Society for Testing Materials. At any rate, the society's committee, A-10, on iron-chromium, iron-chromium-nickel and related alloys has decided to organize separate sub-committees to cover these products and also castings. Jerome Strauss, chief research engineer, Vanadium Corpn. of America, Bridgeville, Pa., is chairman of A-10.

First Plate Purchases for C.&O. Cars Feature Cleveland Mart

Additional Tonnage for Van Sweringen Equipment Expected Shortly—Automobile Builders Buy Steel for April Requirements

CLEVELAND, March 13. — Good tonnages in sheets and strip steel have been placed by the automotive manufacturers for their April requirements and, barring the possibility of interruptions due to labor troubles, this industry is expected to maintain or increase its present pace during the coming month. Miscellaneous demand for bars and sheets has expanded.

Contracting for the second quarter for most rolled steel products is going ahead in a rather limited way, although some consumers are anxious to get under cover as a protection against possible price advances if working hours are reduced and wages increased. However, consumers as a rule are placing only specified tonnages for early needs and are showing little if any concern over the possibility of higher prices. Few mills are making efforts to close contracts but are covering their customers who wish to make commitments for the quarter. Better plant operations is reflected in an increased demand for tool steel.

Ingot output in the Cleveland-Lorain territory is unchanged this week at 69 per cent of capacity.

The first round lot of steel has been placed for freight cars recently ordered by the Van Sweringen railroads. This order is for several thousand tons of plates for Chesapeake & Ohio cars. With the placing of orders for car specialties concluded, other round-lot tonnages for the cars for the Van Sweringen roads probably will be placed shortly. The Erie 30,000-ton rail inquiry is still pending.

Pig iron continues quite active, many consumers placing second quarter contracts.

Pig Iron

The volume of buying for the second quarter has gained in momentum. A Cleveland interest sold 8000 tons during the week for shipment from Lake Erie furnaces, mostly for the coming quarter. While the demand is largely from the automotive industry, there is an increase in the amount of business from the agricultural implement and stove industry. Not much interest is being shown in Southern foundry iron for the second quarter, although a few contracts have been placed. Operations by jobbing foundries in this territory show some improvement. The increase in pig iron shipments over February is being maintained.

Iron Ore

There is little talk of ore prices for the coming season, and it is not expected that prices will be named for several weeks. Ore on Lake Erie docks March 1 amounted to 5,175,886 tons as compared with 5,105,339 tons on the same date a year ago. Shipments from these docks during February were 70,531 tons as compared with 26,239 tons during the same month last year.

Bars, Plates and Shapes

Demand for merchant bars is broadening. Some business is coming from consumers who have been out of the market for a long time. Bids for 2200 tons of sheet steel piling for the Huron breakwater were taken today by the War Department. Awards and inquiries for structural steel and reinforcing bars are not numerous and require only small tonnages. Award of 3600 tons of reinforcing bars and plates for a sewage disposal plant in Cleveland is still held up because funds have not yet been received from the PWA allocation.

Wire Products

Some seasonal demand is developing for fence and barbed wire as retailers are starting to stock up. There is not much activity in other wire products.

Strip Steel

Some good tonnage in both hot and cold-rolled strip was placed by the automotive industry during the week, largely for April requirements, and these orders indicate that heavy production schedules will be maintained during the coming month. In some cases rush shipment is called for. Few consumers have placed contracts for the second quarter.

Bolts, Nuts and Rivets

Present prices have been reaffirmed for the second quarter and manufacturers are starting to solicit contracts for that delivery. These prices are 70 per cent off list for bolts and nuts, $2.75 per 100 lb., Pittsburgh and Cleveland and $2.85 Chicago for large rivets, and 70 and 10 per cent discount for small rivets. Demand for bolts and nuts continues good from the automotive industry, and business from other sources is broadening. Substantial orders have been distributed by the Pennsylvania Railroad for its new freight cars. Rivet orders show a slight improvement.

Sheets

Additional purchases in round tonnages have been made by automobile manufacturers for April shipment. While a few consumers have placed contracts for the quarter, not much interest is being shown in contracts and mills are not pressing consumers for commitments for the quarter. With the reaffirmation of prices there has been an easing up in pressure for deliveries this month, and some consumers have allowed tonnage to lapse and will reinstate it later as needed. Some new demand is developing for hot-rolled and galvanized sheets for air-conditioning installations.

Scrap

The recent price advances have brought out a plentiful supply of scrap, and shipments against recently placed contracts have been so heavy to some of the Youngstown district mills that a congestion has been caused and deliveries have been held up. As a result dealers' prices on steel-making scrap have softened and heavy melting steel and some other grades have declined 50c. a ton. As heavy consumption is being maintained, it is believed that this weakness may be only temporary. No new buying by consumers is reported.

Railroad Equipment

Alaska Railroad has ordered 20 hopper cars from Koppel Industrial Car & Equipment Co.

Navy Department, Bureau of Supplies and Accounts, Washington, closes bids March 16 on three flat cars and two box cars.

Boston & Maine is expected to inquire soon for a substantial quantity of steel for car repair purposes.

Seaboard Air Line has asked for a Government loan to finance the purchase of 1000 50-ton box and 100 phosphate cars and five locomotives.

RAILS

Wabash has placed 6850 tons of rails with Illinois Steel Co. and 3150 tons with Inland Steel Co.

Missouri-Kansas-Texas has purchased 4700 tons of rails, of which 2500 tons went to Illinois Steel Co., 1100 tons to Inland Steel Co. and 1100 tons to Colorado Fuel & Iron Co.

Seaboard Air Line has ordered 11,200 tons of rails and 2000 tons of fastenings from Tennessee Coal, Iron & Railroad Co.

New York Central will take bids March 20 on 40,000 tons of rails, 1,750,000 tie plates, 30,000 kegs of spikes and 7000 to 8000 kegs of track plates.

New York, Ontario & Western has inquired for 200,000 tie plates.

Bangor & Aroostook has purchased 750 tons of tie plates.

Erie has placed 1250 tons of rails with Bethlehem Steel Co. for improvements at Elmira, N. Y.

Baltimore & Ohio has applied for a Government loan to finance the purchase of 35,000 tons of rails with necessary accessories.

Rail Release Advance Eastern Steel Output

Philadelphia District Production Rises to 33 Per Cent, Although Miscellaneous Demand for Finished Steel Products Continues Light

PHILADELPHIA, March 13.—With the Pennsylvania Railroad beginning to release rails and track accessories against orders placed last December, the Eastern Pennsylvania steel-making rate has advanced three points to 33 per cent of capacity. Nevertheless, the increase has occurred entirely in the plants of the leading interest, with the smaller independent companies barely maintaining the minimum output of recent weeks. Finishing mill schedules likewise remain at a low rate, increases having been reported only in the case of rails. Tin plate schedules remain at a high level and sustained activity is reported by makers of sheets.

Unseasonably cold weather is still a deterrent to general business improvement, but both buyers and sellers of steel are disturbed by events at Washington and market sentiment is by no means buoyant. The threat of labor trouble hangs over the district and the prospect of higer wages has again raised the subject of price advances on pig iron and steel products.

Sizable inquiry for plates, shapes and bars is generally lacking, although the Navy Department will take bids March 20 on 4700 tons of plates and 350 tons of bars for seven coast guard cutters. Bids will close April 6 on another section of the Philadelphia-Camden bridge subway connection which will require 2000 tons of structural steel, 1700 tons of sheet steel piling and 1000 tons of reinforcing bars.

Pig Iron

The prospect of higher wages in the iron and steel industry has again led to talk of higher pig iron prices and some tonnage has been booked in the last week because of that possibility. While sellers might be expected to offer consumers an opportunity to cover for the second quarter, this is by no means compulsory. Large users of basic iron are showing no interest in their future requirements and the same might be said of the pipe foundries in the district. However, foundry melt is gradually improving in this section and stocks of iron are being reduced. Announcement of the second quarter price on ferromanganese must be made this week.

Plates, Shapes and Bars

Makers of the heavy hot-rolled products are frankly disappointed in the failure of orders to show more improvement this month. Although a little inquiry for specific projects is appearing from time to time, miscellaneous demand is light with no definite improvement in sight. Approximately 2800 tons of galvanized and 1900 tons of black plates will be required for seven coast guard cutters to be built in the Brooklyn, Philadelphia and Charleston, S. C., navy yards on which bids are asked March 20. Bids will be taken April 6 on a section of the Philadelphia-Camden bridge subway approach which will take 2000 tons of structural steel, 1700 tons of piling and 1000 tons of reinforcing bars. One more section of this project remains to come out. A Pennsylvania railroad bridge near Washington will take 850 tons of shapes and the Lackawanna Steel Construction Corpn. is low on 800 tons for a State highway bridge at Newport, Pa.

Sheets

The Pennsylvania Railroad has asked for Clayton Act bids on 250 tons of black and galvanized sheets for delivery during the second quarter. Sheet demand from other sources seems to have abated somewhat, although automobile body plants in the territory continue to take deliveries regularly. Radio makers are inactive, although makers of stoves and ranges are slightly busier. A little second quarter tonnage has been booked, but price advances are again being considered and mills are no longer anxious to make commitments.

Warehouse Business

Sales of steel products out of warehouse are at about the same level as prevailed in January and February. Prices are well sustained and demand is fairly well diversified as to individual products.

Imports

The following iron and steel imports were received here last week: 3223 tons of pig iron from the Netherlands and 495 tons of the same product from British India, 1200 tons of chrome ore from Portuguese Africa and 14 tons of the same product from British South Africa, 55 tons of structural shapes and 15 tons of steel bands from Belgium, and 32 tons of steel forgings from Sweden.

Scrap

With the exception of higher quotations on the cast grades, the market is barely holding its own. Failure of local mills to show interest in forward purchases is a depressing influence, although the leading interest is said to be accumulating steel quietly at around the quoted levels. A nearby consumer is paying $10 for No. 2 steel, and No. 1 cast has been sold at $13.50. Carwheels are also stronger and higher prices on old hydraulic bundles are reported.

Large Bridge Inquiries Out on Coast

SAN FRANCISCO, March 12.—Oregon highway bridges featured the new inquiries of the week, calls for bids being issued for two major structures and tentative dates being set on three others. A 3028-ft. bridge over Alsea Bay at Waldport, Ore., will require approximately 1000 tons of reinforcing bars and 150 tons of structural steel. Specifications for a bridge and approach viaducts across Coos Bay, near North Bend, Ore., call for 2085 tons of reinforcing bars, 3450 tons of structural steel and 260 tons of sheet piling. A viaduct and bridge across Yaquina Bay at Newport, for which bids will be taken in June, will require 1063 tons of bars and 1880 tons of shapes. Approximately 487 tons of reinforcing bars and 290 tons of structural steel will be used in a Siuslaw River bridge, while viaduct approaches over the Umpqua River call for 533 tons of bars and 670 tons of shapes.

At Fort Lewis, Wash., structural steel awards were made for 335 tons for barracks and 200 tons for gun sheds to Young Iron Works and Pacific Coast Steel Corpn. respectively. Isaacson Iron Works booked 160 tons for stables and Wallace Bridge & Structural Steel Co. was awarded 125 tons for repair shops. Approximately 100 tons of reinforcing bars for officers' quarters at Fort Lewis went to Pioneer Sand & Gravel Co. The largest letting of the week was 1000 tons of reinforcing bars for a causeway at the Navy Yard at Mare Island, Cal. Soule Steel Co. was the successful bidder. At San Francisco the Pacific Coast Steel Corpn. took 135 tons of structural steel for towers for the Forest Service. Consolidated Steel Corpn. was awarded 402 tons of plates by the Metropolitan Water District at Los Angeles.

Awards for the week aggregated 1041 tons of structural steel and 1658 tons of reinforcing bars. New inquiries totaled 7184 tons of structural steel, 5603 tons of reinforcing steel and 347 tons of plates.

Sheet Output Higher At Buffalo

BUFFALO, March 13. — Steel mill operations are maintaining the pace of the previous week with no changes, except that Seneca sheet division of Bethlehem Steel Corpn. is now running at 90 per cent of capacity instead of 80 per cent.

A Buffalo concern will fabricate 100 tons of structural steel for the Niagara County garage at Lockport, N. Y. No award had been made at this writing of the steel for the Eastern States Milling Co. plant additions. Steel warehouses are looking forward to an active month; February was one of the best in years.

More disposition to cover for future requirements of pig iron has been apparent since the second quarter opened. Tonnages are small, but in the main there is more interest in the market, and foundry operations appear to be a little better.

The largest scrap consuming interest in the territory purchased 5000 tons of No. 1 and No. 2 heavy melting steel last week at $13 for the No. 1 and $11.50 for the No. 2, or one dollar above its previous purchase of a week before. The market is strong and appears to be rising. Tonnage dealers will not make a sale, preferring to hold for what appears to be a $14 or $14.50 market in the near future. The buyer in the last transaction is lower on scrap supply than it has been at any time in years, and apparently must enter the market again for heavy tonnage before navigation opens and any vessel shipments become available. At the same time local scrap men are of the opinion that little scrap in the Detroit area will be available for Buffalo mills, and add that the Atlantic seaboard has been denuded of scrap by heavy shipments to foreign melters during the past year. If the Youngstown and Pittsburgh markets remain strong, continued scarcity of scrap in this territory seems certain. Dealers are continuing to pay $10.50 for stove plate and even $10.75, and $8.50 and $8.75 for short mixed borings and turnings. A sale of steel rails, 3 ft. and under, at $15 is noted.

Canadian Business Still Expanding

TORONTO, ONT., March 13.—The Canadian iron and steel industry has been steadily increasing operations and further improvement in this respect is anticipated. While demand is largely for spot shipment, some future delivery booking has been done by the automotive industry, and mills are said to hold good orders for sheets, bars, ingots, wire, etc. The Canadian mining industry also is responsible for a large part of the new business developing in the steel branch. For some time past there has been a steady demand for steel, as well as general machinery and mill equipment, for the mines throughout the Dominion.

The Steel Co. of Canada, Ltd., Hamilton, Ont., has announced that two additional buildings will be added to its plant immediately. Plans call for extensions to the wire department and the ingot mold shop that will involve an expenditure of $60,000.

Dominion Foundries & Steel Co., Hamilton, also has announced plans for plant addition.

Demand for pig iron is holding at its peak level for the year with awards totaling upward of 600 tons per week. Blast furnace operators report production holding at better than 30,000 tons a month. While the greater part of output is basic for further use of producing companies, there has been some increase in the run of foundry and malleable iron recently. Imports continue light, with only small tonnages of special grades coming into the market. Prices are firm and unchanged.

Trading in scrap is showing improvement and, while demand is specialized, more lines are moving into the active list. Inquiries are being received from British consumers and there will be large shipments of steel scrap to Britain during the summer season. Foundries are taking larger tonnages of cast scrap and dealers are encountering more difficulty in finding supplies locally to fill orders, with the result that some are importing from the United States. Prices are firm.

Materials Handling Equipment. — Saginaw Stamping & Tool Co., Saginaw, Mich. Catalog of 110 pages illustrating and describing indoor transportation equipment, including conveyors, floor trucks, pneumatic tired tractor and truck wheels, casters, gravity conveyor bearings and rollers, troughing idlers, automatic lubricators for continuous conveyors, chain hoist trolleys and like equipment. Tables of dimensions and capacities are given.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel *Base per Lb.*
F.o.b. Pittsburgh mill	1.75c
F.o.b. Chicago or Gary	1.80c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.80c.
Del'd Detroit	1.90c.
F.o.b. Buffalo	1.85c.
F.o.b. Birmingham	1.90c.
F.o.b. cars dock Pacific ports	2.30c.
F.o.b. cars dock Gulf ports	2.15c.

Rail Steel
(For merchant trade)

F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c.

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Cleveland	1.95c.
Del'd Detroit	2.05c.
F.o.b. Youngstown	1.95c.
F.o.b. cars dock Pacific ports	2.35c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. Chicago	1.95c.

Rail Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.80c.

Iron

Common iron, f.o.b. Terre Haute, Ind.	1.60c. to 1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.89c.
Common iron del'd New York	1.93c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Birmingham	1.85c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.885c.
F.o.b. Coatesville	1.80c.
F.o.b. Sparrows Point	1.80c.
Del'd New York	1.98c.
F.o.b. dock cars Pacific ports	2.25c.
F.o.b. cars dock, Gulf ports	2.10c.
Wrought iron plates, f.o.b. P'gh	3.90c.

Floor Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.905c.
Del'd New York	1.9525c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. dock cars Pacific ports (standard)	2.25c.
F.o.b. dock cars Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base..2.45c. a lb. except at Bethlehem where the price is 2.55c. Delivered price at Detroit is 2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1¼% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ⅛c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.15c.
Bars, Cleveland	2.15c.
Bars, Buffalo	2.20c.
Bars, Detroit	2.30c.
Bars, eastern Michigan	2.35c.
Shafting, ground, f.o.b. mill, 1½ in.	3.40c.
1-3/16 to 1¼ in.	2.90c.
1-9/16 to 1⅞ in.	2.75c.
1-15/16 to 2⅛ in.	2.60c.
2-15/16 to 6 in.	2.45c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Detroit	1.95c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific ports	2.42½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Detroit	2.45c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific ports	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Detroit	2.50c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.00c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Detroit	2.95c.
No. 20 gage, del'd Phila.	3.04c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.45c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific ports	3.55c.
No. 24 Wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.25c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Gary	2.75c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c.
All widths up to 24 in., Chicago	1.85c.
All widths up to 24 in., del'd Detroit	1.95c.
Cooperage stock, Pittsburgh	1.85c.
Cooperage stock, Chicago	1.95c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

Base per Keg

Standard wire nails	$2.35
Smooth coated nails	2.35
Galvanized nails:	
15 gage and coarser	4.35
16 gage and finer	4.85

Base per 100 Lb.

Smooth annealed wire	$2.35
Smooth galvanized wire	2.70
Polished staples	3.05
Galvanized staples	3.30
Barbed wire, galvanized	2.85
Woven wire fence, base column	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	57	38½	¼ & ⅜	+1½	+21½
½	62	50½	½	31½	15
¾	65½	55½	¾	36½	20½
1 to 3	67½	58½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63½	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	68½	59½	4 to 8	40	28½
7 and 8	67½	57½	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	54½	41½	¼ & ⅜	+2½	+34½
½	60	51	½	32½	17½
¾	64½	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4	45½	33
3½ to 6	69	61	4½ to 6	45	32½
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	33	1½ in.—1¾ in.	44
2½ in.—2¾ in.	40	2 in.—2¼ in.	13
3 in.	44	2½ in.—2¾ in.	16
3¼ in.—3½ in.	47	3 in.	17
4 in.	49	3¼ in. to 3½ in.	18
4½ in. to 6 in.	42	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1½ to 1¾-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes
Cold-Drawn

1 in.	68	3 in.	38
1¼ to 1½ in.	68	3¼ to 3½ in.	41
1¾ in.	68	4 in.	43
2 to 2¼ in.	27	4½, 5 and 6 in.	36
2½ to 2¾ in.	34		

Hot-Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	47
2½ and 2¾ in.	40	4 in.	49
3 in.	44	4½, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1¾-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1¾-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 1 points.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$32.00
Light rails (from rail steel) per gross ton	31.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	70, 25 and 10
Stove bolts in packages, Ch'go.	70, 25 and 10
Stove bolts in packages, Cleveland,	70, 25 and 10
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	85
Stove bolts in bulk, Cleveland	85
Tire bolts	60

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm	70 and 10

Cap and Set Screws
(Freight allowed up to but not exceeding 65c. per 180 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ⅝ in. and smaller	75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	80
Upset set screws cut and oval point	75 and 10
Milled studs	65 and 5

STAINLESS STEEL

(18% Cr. 8% Ni. 0.08 to 0.12% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$26.00
Forging quality	31.00

Delivered Detroit

Rerolling	$29.00
Forging quality	34.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$26.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Pig Iron, Ores, Ferroalloys

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.

Base price, $49 a gross ton except at Bethlehem, where it is $51.

Price del'd Detroit is $52.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.

Uncropped, $28 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.50
Foundry, f.o.b. Connellsville Prompt	$4.25 to 5.25
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland delivered	9.27
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.55 to $1.80
Mine run coking coal f.o.b. W. Pa.	1.80 to 2.00
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.75c.
No. 5 industrial fuel oil	3.00c.
Per Gal f.o.b. Cleveland	
No. 3 distillate	5.75c.
No 4 industrial	5.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	5.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in., del'd New York	46.00
6-in., and larger, Birmingham, 36.00 to 37.00	
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra.

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$18.50	$19.00	$18.00	$19.50
Bethelehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	....	18.00	....
Neville Island, Pa.	18.00	18.00	17.00	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	....
Duluth, Minn.	18.00	18.00	....	18.50
Birmingham	13.50	....	12.50	....
Provo, Utah	16.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass	$19.00	$19.50	$18.50	$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76	....	....
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	19.26	19.26	....	....
Indianapolis				
From Hamilton, Ohio	19.77	19.77	....	....
South Bend, Ind.				
From Chicago	19.55	19.55	....	....
Milwaukee				
From Chicago	18.50	18.50	....	....
St. Paul				
From Duluth	19.44	....	....	....
Davenport, Iowa				
From Chicago	19.26	19.26	....	....
Kansas City				
From Granite City	20.04	20.54	....	....

Delivered prices on Southern iron for shipment to Northern points are 35c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N.Y. $23.00
Johnson City, Tenn. 23.00
Del'd Chicago 23.65

GRAY FORGE PIG IRON

Valley furnace $17.50

CHARCOAL PIG IRON

Lake Superior furnace $20.50
Delivered Chicago 23.54
Delivered Buffalo 23.78

CANADA

Pig Iron

Per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$85.00
Domestic, 80%, seaboard, (ton lots)	92.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.25
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads	$1.25 to $1.35
Ferrotungsten, less carloads	1.30 to 1.35
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace, carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorous, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.35
Old range, non-Bessemer, 51.50% iron	4.25
Mesabi Bessemer, 51.50% iron	4.25
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 63½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	24c.
Manganese, African, Indian, 44-46%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid, delivered*	$15.00
Tungsten, domestic scheelite, delivered	$14.50 to $15.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, CrO_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$14.25 to $14.75
No. 2 heavy melting steel	13.25 to 13.75
No. 2 railroad wrought	14.25 to 14.75
Scrap rails	14.25 to 14.75
Rails 3 ft. and under	15.50 to 16.00
Sheet bar crops, ordinary	15.00 to 15.50
Compressed sheet steel	14.25 to 14.75
Hand bundled sheet steel	12.50 to 13.00
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.50
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels	13.00 to 13.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	13.50 to 14.00
Railr. knuckles and couplers	16.00 to 16.50
Rail, coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Low phos. punchings	16.00 to 16.50
Steel car axles	17.00 to 17.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$12.25 to $12.75
Shoveling steel	12.25 to 12.75
Hydraulic comp. sheets	$11.25 to $11.75
Drop forge flashings	10.25 to 10.75
No. 1 busheling	11.00 to 11.50
Rolled carwheels	13.00 to 13.50
Railroad tires	13.00 to 13.50
Railroad leaf springs	13.00 to 13.50
Axle turnings	10.00 to 10.50
Steel couplers and knuckles	13.00 to 13.50
Coil springs	13.25 to 13.75
Axle turnings (elec. fur.)	11.00 to 11.50
Low phos. punchings	12.75 to 13.25
Low phos. plates, 12 in. and under	13.25 to 13.75
Cast iron borings	7.75 to 8.25
Short shoveling turnings	7.75 to 8.25
Machine shop turnings	7.25 to 7.75
Rerolling rails	13.00 to 13.50
Steel rails, less than 3 ft.	13.00 to 13.50
Steel rails, less than 2 ft.	13.50 to 14.00
Angle bars, steel	13.00 to 13.50
Cast iron carwheels	12.25 to 12.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	10.50 to 11.00

	Per Net Ton
Iron car axles	$12.75 to $13.25
Steel car axles	12.25 to 12.75
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	11.00 to 11.50

No. 2 busheling	$4.50 to	$5.00
Locomotive tires, smooth	10.50 to	11.00
Pipe and flues	5.50 to	6.00
No. 1 machinery cast	9.50 to	10.00
Clean automobile cast	9.00 to	9.50
No. 1 railroad cast	9.00 to	9.50
No. 1 agricultural cast	8.50 to	9.00
Stove plate	7.50 to	8.00
Grate bars	6.50 to	7.00
Brake shoes	8.50 to	9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	....	$12.00
No. 2 heavy melting steel	$9.50 to	10.00
No. 1 railroad wrought	....	11.00
Bundled sheets	....	9.50
Hydraulic compressed, new	....	10.00
Hydraulic compressed, old	8.50 to	9.00
Machine shop turnings	....	7.50
Heavy axle turnings	10.00 to	10.50
Cast borings	5.50 to	6.00
Heavy breakable cast	11.50 to	12.00
Stove plate (steel works)	....	9.50
No. 1 low phos. heavy	15.00 to	15.50
Couplers and knuckles	14.50 to	15.00
Rolled steel wheels	14.50 to	15.00
No. 1 blast furnace	5.50 to	6.00
Spec. iron and steel pipe	....	10.00
Shafting	....	16.50
Steel axles	....	14.50
No. 1 forge fire	....	11.00
Cast iron car wheels	....	13.00
No. 1 cast	13.00 to	13.50
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	....	13.00

CLEVELAND

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	$12.00 to	$12.50
No. 2 heavy melting steel	11.00 to	11.50
Compressed sheet steel	11.50 to	12.00
Light bundled sheet stampings	8.50 to	9.00
Drop forge flashings	11.50 to	12.00
Machine shop turnings	9.00 to	9.50
Short shoveling turnings	9.00 to	9.50
No. 1 busheling	11.00 to	11.50
Steel axle turnings	10.00 to	10.50
Low phos. billet crops	14.50 to	15.00
Cast iron borings	8.75 to	9.25
Mixed borings and short turnings	9.00 to	9.50
No. 2 busheling	9.00 to	9.50
No. 1 cast	11.00 to	11.50
Railroad grate bars	7.50 to	8.00
Stove plate	7.00 to	7.50
Rails under 3 ft.	15.00 to	15.50
Rails for rolling	17.00 to	17.50
Railroad malleable	12.00 to	12.50
Cast iron carwheels	....	12.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:		
No. 1 heavy melting steel	$12.75 to	$13.25
No. 2 heavy melting scrap	11.25 to	11.75
Scrap rails	12.25 to	12.75
New hydraul. comp. sheets	11.25 to	11.75
Old hydraul. comp. sheets	10.25 to	10.75
Drop forge flashings	11.25 to	11.75
No. 1 busheling	11.25 to	11.75
Hvy. steel axle turnings	10.00 to	10.50
Machine shop turnings	7.00 to	7.50
Knuckles and couplers	14.50 to	15.00
Coil and leaf springs	14.50 to	15.00
Rolled steel wheels	14.50 to	15.00
Low phos. billet crops	14.50 to	15.00
Short shov. steel turnings	8.50 to	9.00
Short mixed borings and turnings	8.50 to	9.00
Cast iron borings	8.50 to	9.00
No. 2 busheling	7.50 to	8.00
Steel car axles	13.00 to	13.50
Iron axles	13.00 to	13.50
No. 1 machinery cast	13.00 to	13.50
No. 1 cupola cast	12.00 to	13.00
Stove plate	10.25 to	10.75
Steel rails, 3 ft. and under	14.50 to	15.00
Cast iron carwheels	12.50 to	13.00
Industrial malleable	12.50 to	13.00
Railroad malleable	12.50 to	13.50
Chemical borings	10.00 to	11.00

BIRMINGHAM

Per gross ton delivered consumers' yards:		
Heavy melting steel	....	$10.00
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plates	$7.00 to	7.50
Steel axles	10.50 to	11.00
Iron axles	10.50 to	11.00
No. 1 railroad wrought	....	7.00
Rails for rolling	....	10.50
No. 1 cast	9.00 to	9.50
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:		
Selected heavy steel	$10.50 to	$11.00
No. 1 heavy melting	9.50 to	10.00
No. 2 heavy melting	9.50 to	10.00
No. 1 locomotive tires	9.00 to	9.50
Misc. stand.-sec. rails	12.00 to	12.50
Railroad springs	11.50 to	12.00
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	9.50 to	10.00
No. 1 busheling	6.50 to	7.00
Cast iron borings and shoveling turnings	5.25 to	5.75
Rails for rolling	12.00 to	12.50
Machine shop turnings	5.25 to	5.75
Heavy turnings	6.00 to	6.50
Steel car axles	11.25 to	11.75
Iron car axles	12.50 to	13.00
Wrot iron bars and trans	9.75 to	10.25
No. 1 railroad wrought	6.75 to	7.25
Steel rails less than 3 ft.	12.50 to	13.00
Steel angle bars	11.50 to	12.00
Cast iron carwheels	9.25 to	9.75
No. 1 machinery cast	9.00 to	9.50
Railroad malleable	10.00 to	10.50
No. 1 railroad cast	9.50 to	10.00
Stove plate	6.50 to	7.00
Relay rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	9.00 to	9.50

BOSTON

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	$8.25 to	$8.50
Scrap T rails	8.25 to	8.50
No. 2 steel	7.00 to	7.25
Breakable cast	7.00 to	7.25
Machine shop turnings	5.00 to	5.50
Bundled skeleton, long	6.50 to	7.00
Forge flashings	6.00 to	6.50
Blast furnace scrap	2.75 to	3.00
Shafting	11.00 to	11.25
Steel car axles	10.50 to	11.00
Wrought pipe	5.00 to	5.25
Cast iron borings, chemical	8.50 to	9.00
Per gross ton delivered consumers' yards:		
Textile cast	$10.00 to	$10.50
No. 1 machinery cast	10.00 to	10.25
Stove plate	7.00 to	7.25
Railroad malleable	11.00 to	11.50

NEW YORK

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	$8.00 to	$9.50
No. 2 heavy melting steel	7.00 to	8.00
Heavy breakable cast	8.00 to	8.25
No. 1 machinery cast	....	8.50
No. 2 cast	7.00 to	7.50
Stove plate	....	6.00
Steel car axles	10.50 to	10.75
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	$6.50 to	$7.00
Spec. iron and steel pipe	5.75 to	6.00
Forge fire	5.50 to	6.00
Rails for rerolling	9.00 to	9.25
Short shoveling turnings	3.00 to	4.00
Machine shop turnings	3.50 to	4.00
Cast borings	4.50 to	4.75
No. 1 blast furnace	2.50 to	4.00
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	5.00 to	5.50
Per gross ton, delivered local foundries:		
No. 1 machinery cast		$12.00
No. 1 hvy. cast (cupola size)		10.50
No. 2 cast		9.00

CINCINNATI

Dealers' buying prices per gross ton:		
Heavy melting steel	$8.75 to	$9.50
Scrap rails for melting	9.50 to	10.00
Loose sheet clippings	6.00 to	6.50
Bundled sheets	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Machine shop turnings	6.00 to	6.50
No. 1 busheling	7.00 to	7.50
No. 2 busheling	4.00 to	4.50
Rails for rolling	10.00 to	10.50
No. 1 locomotive tires	9.50 to	10.00
Short rails	12.25 to	12.75
Cast iron carwheels	8.75 to	9.25
No. 1 machinery cast	10.00 to	10.50
No. 1 railroad cast	9.50 to	10.00
Burnt cast	7.00 to	7.50
Stove plate	7.00 to	7.50
Agricultural malleable	9.00 to	9.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:		
Heavy melting steel	$10.00 to	$10.50
Borings and short turnings	7.75 to	8.25
Long turnings	7.00 to	7.50
No. 1 machinery cast	11.00 to	11.50
Automotive cast	12.00 to	12.50
Hydraul. comp. sheets	10.00 to	10.50
Stove plate	8.00 to	8.50
New factory busheling	9.00 to	9.50
Old No. 2 busheling	6.25 to	6.75
Sheet clippings	7.25 to	7.75
Flashings	8.75 to	9.25
Low phos. plate scrap	10.25 to	10.75

CANADA

Dealers' buying prices per gross ton:		
	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.05c.
Structural shapes	3.05c.
Soft steel bars and small shapes	2.85c.
Reinforcing steel bars	3.00c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands, under ¼ in.	3.10c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.70c.
Hot-rolled sheets (No. 10)	2.85c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.25
Wire, black, soft ann'l'd, base per 100 lb.	*2.575c.
Wire, galv. soft, base per 100 lb.	*2.925c.
Common wire nails, per keg	*2.557c.
Cement coated nails, per keg	*2.557c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plate sand structural shapes	3.10c.
Soft steel bars	2.90c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.40c.
Flats and squares	3.40c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.20c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.30c.
Hot-rolled sheets (No. 10)	2.85c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3c.
Rivets, boiler (keg lots)	3.10c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex., tap or blank	60 and 5
Hex. head and cap screws	50
Cup point set screws	70
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.75
Com. wire nails, base per keg	2.70c.
Cement c't'd nails, base per keg	2.70c.

NEW YORK

	Base per Lb.
Plates	3.30c.
Structural shapes	3.27c.
Soft steel bars, small shapes	3.17c.
Iron bars	3.24c.
Iron bars, swed. charcoal	7.25c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	4.00c.
Hoops	3.42c.
Bands	3.42c.
Hot-rolled sheets (No. 10)	3.17c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.30c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, 1 x ½ in. and larger	3.50c.
Open hearth spring steel, bases	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.00
	Per Cent
Machine bolt, cut thread:	Off List
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.34c.
Bars, soft steel or iron	3.14c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Galv. sheets (No. 24)	4.54c.
Hot-rolled sheets (No. 10)	3.19c.
Black corrug. sheets (No. 24)	3.99c.
*Galv. corrug. sheets	4.59c.
Structural rivets	3.59c.
Boiler rivets	3.69c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.75c.
*Structural shapes	2.75c.
*Soft steel bars, small shapes, iron bars (except bands)	2.75c.
‡Reinforc. steel bars, sq. twisted and deformed	2.505c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.30c.
*Steel bands, No. 12 to 3/16 in., incl.	3.05c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.40c.
†Galvanized sheets (No. 24)	4.00c.
*Hot-rolled annealed sheets (No. 10)	2.95c.
Diam. pat. floor plates, ¼ in.	4.75c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.21c.
Soft steel bars	2.90c.
Reinforc. steel bars	2.00c. to 2.50c.
Cold-finished steel bars	3.40c.
Flat rolled steel under ¼ in.	3.26c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.76c.
Galvanized sheets (No. 24)	4.36c.
Hot-rolled sheets (No. 10)	3.01c.
Black ann'l'd wire, per 100 lb.	$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.45

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.30c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.35c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.45c.
Hot-rolled sheets (No. 10)	3.10c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.60
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain. 1-in., per 100 lb.	8.30
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.10
4-in.	41.60
Lap-welded steel boiler tubes, 2-in.	16.61
4-in.	38.77

BUFFALO

	Base per Lb.
Plates	3.27c.
Struc. shapes	3.15c.
Soft steel bars	2.95c.
Reinforcing bars	1.95c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.65c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.42c.
Galv. sheets (No. 24)	4.25c.
Bands	3.32c.
Hoops	3.32c.
Hot-rolled unannealed sheets	3.07c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.45c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.45c.
Floor plates, diamond pattern	5.15c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	3.50c.	3.40c.	3.40c.
Shapes, standard	3.50c.	3.40c.	3.40c.
Wide-flanged beams and columns	3.70c.	3.60c.	3.60c.
Soft steel bars	3.55c.	3.40c.	3.40c.
Reinforcing bars	2.35c.	2.35c.	2.35c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.15c.	4.25c.
Hot - rolled sheets (No. 10)	3.75c.	3.65c.	3.65c.
Galv. sheets (No. 24)	4.85c.	4.75c.	4.85c.
Struc. rivets, ½ in. and larger	6.25c.	6.00c.	5.90c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg			
less carload	$3.35	$3.25	$3.45

All items subject to differentials for quantity.

Reinforcing Steel

Awards 3050 Tons—New Projects 12,900 Tons

AWARDS

Quincy, Mass., 380 tons, Fore River bridge deck, to Kalman Steel Corpn.

Vernon, Conn., 250 tons, highway, to Truscon Steel Co.

Passaic County, N. J., 350 tons, highway and structure, to Joseph T. Ryerson & Sons, Inc.

Fort Lewis, Wash., 100 tons, officers' quarters, to Pioneer Sand & Gravel Co.

Pittsburgh, 500 tons, Roller Crest Dam, Montgomery Island, to Jones & Laughlin Steel Corpn.

Pearl Harbor, T. H., 300 tons, power plant, general contract, to C. C. Moore & Co., steel to an unnamed bidder.

Mare Island, Cal., 1000 tons, causeway at Navy Yard, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Hampton, Mass., 360 tons, sea wall.

State of New Jersey, 500 tons, highway projects; bids March 26.

Chicago, 200 tons, sewerage projects, section F, for Sanitary District.

Chicago, 590 tons, sewerage project No. 8 for Sanitary District, Michael Pondarelli, Chicago, general contractor.

Riverdale, Ill., 350 tons, highway bridge.

Milwaukee, 6200 tons, filtration plant.

State of Colorado, 195 tons, highway work in four counties; bids March 19.

State of California, 105 tons, highway work in seven counties; bids March 27.

Newport, Ore., 1075 tons, State bridge and viaduct over Yaquina River; bids May 17.

Waldport, Ore., 1000 tons, State bridge over Alsea Bay; bids April 5.

State of Oregon, 490 tons, bridge over Siuslow River; bids June 7.

State of Oregon, 535 tons, bridge over Umpqua River; bids June 7.

North Bend, Ore., 2085 tons, State viaduct approaches over Coos Bay; bids April 26.

More Pig Iron Inquiry In New England

BOSTON, March 13.—More activity is noted in pig iron, but the market is by no means active, for the week's sales totaled only about 1000 tons. One melter is inquiring for 800 tons of No. 2X, No. 1X and malleable, another for 100 to 300 tons of No. 1X, and there are several smaller prospects. Indian iron is moving in a small way, and Dutch also. New England melt has failed to increase.

With scrap yards practically free from snow and ice, and with holders in a little more receptive mood, the movement of material to New England and Pennsylvania consuming points has increased noticeably. No. 2 steel and long bundled skeleton are about 50c. a ton higher than a week ago, and steel turnings are stronger, but scrap prices otherwise have not changed, though firmly maintained. Plans have been made to load two or three barges here either this or next week for export. A steamer calling at this port from Norfolk last week had 1500 tons of armor plate from the old warship Saratoga destined for Hull, England.

The coke industry is now operating under the code. Stocks of foundry and domestic at by-product ovens throughout New England are virtually at the vanishing point. It is assumed some change in price will be made on or about April 1.

Scrap Softer at Detroit

DETROIT, March 13.—Following substantial sales of steel scrap to mills at Cleveland and in the Valleys, most grades of old material are off 25c. to 50c. a ton, with both heavy melting steel and hydraulic bundles being bought by dealers at a top price of $10.50. Much of the tonnage destined for consuming points outside this district will be moved by rail instead of by water. The prolonged winter will put the date for opening Lake navigation later than it has been in four or five years. Dealers report that in some cases mills are asking for holdups of shipments because labor trouble may interrupt operations.

... OBITUARY ...

COL. ELBERT A. GIBBS, vice-president in charge of operations of McClintic-Marshall Corpn., a subsidiary of the Bethlehem Steel Co., died of apoplexy in Aiken, S. C., on March 6. He was born at Kasson, Minn., on Dec. 12, 1881. After some work at the University of Minnesota, he took part in various engineering projects throughout the Northwest. In 1905 he was graduated from the college of civil engineering of the University of California and subsequently served as instructor in civil engineering at Cornell University. He spent the summer of 1906 in the estimating and designing department of the McClintic-Marshall organization, Pittsburgh, and on Feb. 1, of the following year, he accepted a permanent position with the company. He held successively positions as assistant to engineer in charge of the department of estimates and designs, engineer in charge of that department, manager of erection in charge of all erection operations west of Harrisburg. Colonel Gibbs was made general manager of McClintic-Marshall Corpn. in charge of all fabricating and erecting operations on Aug. 1, 1919. Ten years later he was elected vice-president and general manager and on Feb. 10, 1931, he was appointed to the position he held at the time of his death. While a member of the A.E.F. during the war he served successively as captain, major, lieutenant colonel and colonel. He was awarded the United States Distinguished Service medal, and was

COL. E. A. GIBBS

decorated by the French Legion of Honor.

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JOHN M. CORNELL, president for many years of J. B. & J. M. Cornell Co., predecessor of the Cornell Iron Works, Inc., died of apoplexy at his home in New York on March 10. He was born in that city on Aug. 27, 1846, and attended the Mount Washington Collegiate Institute until he was 15 years old. He was then apprenticed to learn the iron trade in the works founded by his father in 1840. After two years he was made foreman and at the age of 22 became a partner in the firm. He was made president of the works in 1887 and continued in that capacity until about 1914, when the company was liquidated. It was superseded in 1921 by the Cornell Iron Works, which was organized with two sons, MILTON L., president and treasurer, and JOHN B., vice-president and secretary.

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JOHN DUNNING, formerly superintendent of the D. M. Osborne Rolling Mill, Auburn, N. Y., died at his home in that city on March 8, aged 83 years.

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SAMUEL NEMIROVSKY, president of the Samuel Machinery Co., Inc., Philadelphia, died at his home in that city on Feb. 3, aged 71 years. He organized the company in 1895.

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ELMER F. SUESKE, president of the Sueske Brass & Copper Co., Chicago, died March 6 after an illness of several months. Mr. Sueske was 43 years old.

Steel Price Policy Under the Code

(Concluded from Page 38)

before been seen in peace times that was reflected hardly at all in the price curve.

Chairman: Doesn't that suggest that when prices failed to respond to increased volume, that there may have been a rigidity and a rather high price before the increased volume was coming in to support it? It is on the whole theory of volume and price, that is true.

Mr. Tower: If you are trying to reconcile the experience of 1928 and 1929 with the principle of traditional economics, that the amount or a supply was reflected in facts, I would rather try to explain the situation that not even the extraordinary volume of activity over that period of 18 months could check that price-cutting and the unwarranted competitive methods that had developed in the industry, and which the provisions of the code have tried to correct.

Chairman: How much activity would you have to correct that?

Mr. Tower: I think the activity you require is the activity of making everybody come out in the open with reference to price levels.

Chairman: I was leading to that as the next question. The published data on steel prices show a levelling off at one period prior to the code. Is it your feeling that they represented actual prices or published prices? In other words, was there considerable cutting underneath those published prices as they came in to the price indices?

Mr. Tower: I doubt if anybody except the man who was actually making the sales contracts knows what were the prices during those days. (Laughter.)

Chairman: I think I will accept that as an answer. I am trying to get that into the record because too often when we are asked to make judgment as to certain things we have to take prices which are totally unrelated to the actual prices going on.

Armco Head Praises Employee Representation

EMPLOYEE representation as a means of providing effective communication between employees and management was advocated by Charles R. Hook, president of the American Rolling Mill Co., Middletown, Ohio, speaking before the thirty-fifth annual meeting of the Cincinnati branch, National Metal Trades Association, on March 9. Mr. Hook used as a basis for his talk an address he delivered before the Ohio Bankers' Association in Cincinnati in 1922. The principles of that speech are still applicable, Mr. Hook said, pointing out that in a number of instances representation was given to employees long before the National Industrial Recovery Act was passed.

He pointed out that employees of his company have had representation since 1904 and still have communication with the management, and explained the plan adopted recently by Armco workers which complies with provisions of the recovery act.

"We believe confidence will be created when carefully thought-out policies are definitely stated, so the man on the job knows where his company stands on all matters of prime importance to the organization," he said. He emphasized the belief that plant representation is more effective than outside representation, saying that workers are more closely acquainted with problems which pertain to their own interests.

Other speakers were: James D. Cox, Cleveland Twist Drill Co., Cleveland, national president of the association; H. D. Sayre, Chicago, national commissioner; Warren F. Perry, Columbus, Ohio, executive secretary of the Ohio Manufacturers' Association, and Judge Simon Ross.

George A. Seyler, works manager of the Lunkenheimer Co., Cincinnati, was elected president of the organization for the fourth time. Other officers elected were: Vice-president, J. B. Doan, American Tool Works Co.; treasurer, R. T. Hazelton, Cincinnati Shaper Co.; secretary, E. D. Tribbet, American Laundry Machinery Co., and executive committeemen, Dr. Otto P. Geier, Cincinnati Milling Machine Co., G. P. Doll, Corcoran-Brown Lamp Co., and O. E. Schauer, Cincinnati-Bickford Tool Co. J. M. Manley again was named executive secretary.

Hearing on Tool and Die Shop Code

WASHINGTON, March 13.—Hearing will be held Friday, March 23, on amendments to the approved code of the special tool and die machine shop industry. The amendments have been proposed by the industry's code authority. They redefine the industry and provide for apportioning among members the cost of code administration. The hearing will be in charge of George S. Brady, deputy administrator.

The code for the die casting manufacturing industry has been approved by Administrator Johnson and will become effective March 18.

General Johnson has announced the appointment of the following administration members to code authorities:

Chilled car wheel industry—Horace B. Horton, treasurer, Chicago Bridge & Iron Works.

Cast iron boiler and cast iron radiator industry and steel casting industry—D. V. Stratton, president, Johnson Motor Co., Waukegan, Ill.

Stone-finishing machinery and equipment industry—Harry C. Carr, administrative director for Philadelphia County Relief Board.

Pipe nipple manufacturing industry—Lieut. Col. John W. Hallock, engineer reserves, assigned as chief of Pittsburgh engineer procurement district.

Farm equipment agency, coordinating agency—J. A. Craig, formerly president of Samson Tractor Co. and general manager of Janesville Machine Co., Janesville, Wis.

Prompt Tin Priced at 54.35c., New York As London Quotation Rises Sharply

Market Demands for Electrolytic Copper Reappear—One Seller Offers Prompt Spelter at 4.37½c.—Lead Sales in Good Volume

NEW YORK, March 13.—The market for electrolytic copper shows definite improvement. Many sellers report substantial sales in the open market at a firm price level of 8c. a lb., delivered Connecticut points. This increased interest in fresh commitments and a better volume of shipments on old contracts are judged to indicate improvement of actual consumption of metal. February statistics are expected to show a stock decrease, although the reduction will not perceptibly alter the large stock surplus in this country. In addition to the new domestic demands, American companies continue to dispose of excellent tonnages abroad at c.i.f. prices up to 35 points above the open market here. The market undertone in England is fair, German and Japanese demands are improved, and American interests are actively competing with Belgian concerns to supply France's large requirements.

Public hearings on the copper code opened yesterday, and widespread objections were immediately made, concerning the labor and wage provisions. It is expected that the present document will be greatly altered, and the trade is closely watching developments for the possible inclusion of marketing and production restrictions.

Tin

In sharp contrast with the dull trading of the past month, the domestic market was enlivened during the past week as all consuming outlets negotiated for supplies. The March and April positions were particularly preferred, and prices steadily advanced to today's level of 54.35c. a lb., New York. Stimulated by the demand here, prices in England forged sharply upward, and first call postings today were over £6 higher than a week earlier. Spot standard was quoted abroad at £236 5s. this morning, and Straits in the Far East was strong at £238.

Zinc

One seller is offering prompt Prime Western at 4.37½c. a lb., East St. Louis, but most of the trade is adhering firmly to the 4.40c. position for both spot and second quarter shipments. Competitive business is currently of a carlot nature, although the total tonnage involved is considered satisfactory when compared with past demands. Bookings during the past seven-day period aggregated 2769 tons, against 3200 tons the week before, and 2000 tons sold a fortnight ago. In view of the firm $30 a ton position of Tri-State concentrates, most sellers of spelter are not disposed to consider price concessions, and the better market statistics are generally reflected in a more cautious trading attitude. Joplin output last week rose to 6800 tons, sales and shipments were 6550 and 6250 tons respectively, and visible stocks advanced 500 tons to 14,000 tons. It is estimated that this week's output will show a material decrease. Slab zinc stocks declined 1882 tons last month due to the heavy shipments on sales made in January. February sales of prompt Prime Western totaled 4547 tons at a weighted average price of 4.384c. a lb., as compared with 5615 tons at 4.269c. during January. February bookings for subsequent delivery amounted to 9141 tons at 4.377c., against 14,095 tons at 4.277c. in January.

Lead

In addition to a well maintained consumer demand, the trade is heartened by developments which should result in a constantly improved statistical position. As a result of the better trading sentiment, market quotations are extremely firm at 4c. a lb., New York, and 3.90c., St. Louis, for deliveries nearby and through April. Fresh bookings have improved in volume during the past few days, and leading sellers are experiencing no difficulty in disposing of tonnages equivalent to contracted ore intakes, and, occasionally, past accumulations are being drawn upon. All consuming outlets are represented in the current demands, with ammunition makers specifying more heavily than usual. Over 25,000 tons has already been booked for March shipment, and many tonnage users are apparently under-bought, as evidenced by the current low position of April sales which total only 10,000 tons. The trade expects March shipments to exceed 30,000 tons, which, combined with the output restrictions recently self-imposed by several large producers, should result in a sharp stock decrease.

The Week's Prices. Cents Per Pound for Early Delivery

	March 7	March 8	March 9	March 10	March 12	March 13
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	52.37½	53.20	53.60	....	54.05	54.35
Zinc, East St. Louis	4.40	4.40	4.37½	4.37½	4.37½	4.37½
Zinc, New York	4.75	4.75	4.72½	4.72½	4.72½	4.72½
Lead, St. Louis	3.90	3.90	3.90	3.90	3.90	3.90
Lead, New York	4.00	4.00	4.00	4.00	4.00	4.00

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb. delivered; new No. 12, 20c. a lb. delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 16c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.50c. a lb., New York.
Brass ingots, 85-5-5-5, 8.00c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	55.50c. to 56.50c.
Tin, bar	57.50c. to 58.50c.
Copper, Lake	9.75c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, castings	9.25c. to 10.25c.
*Copper sheets, hot-rolled	15.00c.
*High brass sheets	13.75c.
*Seamless brass tubes	16.25c.
*Seamless copper tubes	16.25c.
*Brass rods	12.25c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	5.75c. to 6.75c.
Lead, sheets	7.75c.
Antimony, Asiatic	9.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	33.00c. to 34.00c.
Babbitt metal, commercial grade	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	58.00c.
Tin, bar	60.00c.
Copper, Lake	9.00c.
Copper, electrolytic	9.00c.
Copper, castings	8.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy. and wire	6.25c.	7.00c.
Copper, light and bottoms	5.25c.	6.25c.
Brass, heavy	3.50c.	4.25c.
Brass, light	3.00c.	3.625c.
Hvy. machine composition	4.75c.	5.625c.
No. 1 yel. brass turnings	4.25c.	5.125c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	3.00c.	3.625c.
Zinc	2.50c.	3.125c.
Cast aluminum	9.50c.	11.25c.
Sheet aluminum	12.25c.	13.50c.

Scrap Iron and Steel Code Signed, Effective March 26

THE code for the scrap iron trade was signed by President Roosevelt March 12 and becomes effective on March 26. Professor Dameron, formerly of Ohio State University, division administrator in division IV, which is under the general jurisdiction of A. D. Whiteside, has been assigned to the code. The Institute of Scrap Iron and Steel is named in the code as the cooperating agency with the NRA, in the scrap iron and steel trade. A meeting of the code authority for the scrap iron trade, which was elected at the last annual convention of the Institute of Scrap Iron and Steel, will be held next week in Washington, for the purpose of organization and putting into effect the necessary rules and regulations for the administration of the code.

The code for the scrap iron trade is part of a master code for the scrap iron, non-ferrous scrap metal and waste materials trades. It represents one single master code for all branches of the waste materials industry, as far as minimum wages and maximum hours are concerned, which are uniform for all branches. The code, however, sets up six separate code authorities to administer the code for the various commodity divisions, and as far as trade practices are concerned, the master code represents six separate codes, in view of the fact that each of the code authorities has the right to file a supplementary code of fair competition. The six code authorities provided in the code cover the following divisions: Scrap iron and steel, non-ferrous scrap metals, scrap rubber, wool stock, cotton rags, and waste paper.

The code sets the following minimum wages for the scrap iron industry: 32½c. per hr. in the North and 27½c. per hr. in the South for male labor. 27½c. per hr. in the North and 22½c. per hr. in the South for female labor.

The term "South" includes the following States: Virginia, North Carolina, South Carolina, Florida, Georgia, Alabama, Tennessee, Mississippi, Louisiana, Arkansas, Oklahoma, Texas, and the District of Columbia; Kentucky and Maryland are also included in the "South" except with respect to the commodities included in the scrap iron and steel trade.

No employee shall work in excess of 40 hr. per week except employees engaged in outdoor work in scrap iron yards, who may be permitted to work up to 48 hr. per week, provided that they shall average not over 40 hr. per week in any 12-week period. Crane and locomotive crews, oxygen plant operators, truck drivers and their helpers shall be permitted to work not to exceed 48 hr. in any one week. Employees engaged in repair and maintenance work shall be permitted to work not to exceed 44 hr. in any one week.

R. F. C. Encourages Bank Loans to Industry

WASHINGTON, March 13.—The Reconstruction Finance Corpn. is encouraging banks to lend to industry where safe loans can be made, and has insisted that many such loans can be made if the banks would take the necessary trouble to whip them into shape. This policy of the RFC was announced today by Chairman Jesse H. Jones in a letter addressed to a banking publication in which Mr. Jones denied that the RFC is making a list of banks that have shown an unwillingness to make loans on reasonable security for the aid of industry and business.

"The effort of the RFC with regard to banks is, and has been, to safeguard bank deposits and to make it possible for all banks to lend in the ordinary way in financing agriculture, business and industry," Mr. Jones stated.

Peter Bogdanoff, chairman of the Amtorg Trading Corpn., will sail soon for Moscow to discuss with the Soviet Government details of a program proposing credit arrangements through the Export-Import bank in connection with the purchase of heavy machinery, railroad equipment, 100,000 tons of copper, 500,000 bales of cotton and other requirements, which are said to include tin plate. Mr. Jones announced that the Soviet Government is prepared to make the purchases if proper credit terms can be made with the bank, of which Mr. Jones is a trustee. The Amtorg has suggested credits up to five years.

British Iron and Steel Production in February

LONDON, ENGLAND, March 13.—(*By Cable*)—British production of pig iron for February, 1934, was 414,400 tons, a decrease of 26,900 tons from the preceding month of January. Steel ingot production was 707,500 tons as compared with 711,000 tons in January.

While these monthly totals show a recession in tonnage, this must be interpreted in the light of the shorter working month. Actually, British operating rates were higher in February than in January both for iron and steel, the daily rate for pig iron being 4 per cent above the preceding month and for steel, 10 per cent above it.

Monthly totals for 1933 is shown in the following table:

1933		
Jan.	286,600	444,400
Feb.	270,800	482,700
March ...	332,200	577,700
April	324,700	509,600
May	339,900	599,600
June	345,600	568,800
July	343,900	567,500
Aug.	362,700	551,300
Sept.	359,700	669,000
Oct.	373,300	668,300
Nov.	374,900	695,000
Dec.	409,300	668,900
	4,123,600	7,002,800
1934		
Jan.	441,300	711,000
Feb.	414,400	707,500

Pig Iron *daily* rate up almost 4 per cent. Steel daily rate up 10 per cent in February.

Fabricated Structural Steel

Awards Lower—New Projects Decline Slightly

LETTINGS of 14,800 tons were mostly in small tonnages and compare with 21,800 tons last week. The only sizable award was 5000 tons for the Fore River bridge superstructure at Fore River, Mass.; an industrial plant at South Amboy, N. J., calls for 1800 tons. Plate awards total 1900 tons. New structural projects of 13,450 tons compare with 13,000 tons in the previous week and 1200 tons two weeks ago. With the exception of 2600 tons for a State bridge at Apalachicola, Fla., inquiries are for small lots. Bids will be taken April 26 on 3710 tons for a viaduct across Coos Bay at North Bend, Ore., and on May 17 for a viaduct at Newport, Ore., over Yaquina Bay. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Quincy, Mass., 5000 tons, Fore River bridge superstructure, to McClintic-Marshall Corpn.

Cape Cod, Mass., 175 tons, pier towers for canal, to Phoenix Bridge Co.

Passaic County, N. J., 230 tons, highway bridge, to James Radcliffe & Sons, Paterson, N. J.

South Amboy, N. J., 1800 tons, industrial building, to American Bridge Co.

Queens County, N. Y., 275 tons, highway bridge, to National Bridge Works.

Lockport, N. Y., 100 tons, Niagara County garage, to R. S. McManus Steel Construction Co.

Aberdeen, Md., 250 tons, airplane hangar, to Dietrich Brothers.

Williamsport, Md., 170 tons, repairs to bridge, to Washington Berkeley Bridge Co.

Newport, Pa., 800 tons, State highway bridge, to Lackawanna Steel Construction Corpn., Buffalo.

Indian Gap, Pa., 250 tons, water supply system for United States Government, to Pittsburgh-Des Moines Steel Co.

Washington, 250 tons, steel piling, sewer, to Kalman Steel Corpn.

SOUTH AND SOUTHWEST

Roanoke, Va., 300 tons, highway bridge, to Virginia Bridge & Iron Co.

Logan County, W. Va., 750 tons, highway bridge, to American Bridge Co.

Pierson, Ga., 250 tons, State highway bridge, to McClintic-Marshall Corpn.

Hartford, Ky., 190 tons, highway bridge, to McClintic-Marshall Corpn.

State of Oklahoma, 275 tons, bridges, to J. B. Klein Iron & Foundry Co.

CENTRAL STATES

Cleveland, 180 tons, steel piling for Pennsylvania Railroad, to Bethlehem Steel Co.

Toledo, Ohio, 200 tons, Naval Reserve Armory, to Whitehead & Kales.

East Liverpool, Ohio, 125 tons, pottery plant building, to Pittsburgh Bridge & Iron Co.

Ecorse, Mich., 200 tons, plant addition for Great Lakes Steel Corpn., to Whitehead & Kales.

Chicago, 300 tons, hog-killing plant for Wilson & Co., to Hansell-Elcock Foundry Co.

Chicago, 350 tons, building for Sears, Roebuck & Co., to an unnamed bidder.

Cloquet, Minn., 200 tons, wooden-ware building, to American Bridge Co.

State of Minnesota, 390 tons, highway bridges at Hopkins, St. Louis Park and Ascov, to American Bridge Co.

State of Minnesota, bridges, 450 tons; 250 tons to Minneapolis-Moline Power Implement Co., 200 tons to Illinois Steel Bridge Co., Jacksonville, Ill.

Boone, Iowa, 140 tons, beam spans, to Pittsburgh-Des Moines Steel Co.

Lucas County, Iowa, 140 tons, beam spans, to Des Moines Steel Co.

Frontier and Howard Counties, Neb., 750 tons, bridges, to Pittsburgh-Des Moines Steel Co.

WESTERN STATES

Fort Lewis, Wash., 285 tons; stables, 160 tons, to Isaacson Iron Works; repair shops, 125 tons, to Wallace Bridge & Structural Steel Co.

San Francisco, 150 tons, towers for Forest Service, to Pacific Coast Steel Corpn.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Lawrence, Mass., 100 tons, garage for street railway.

Ossining, N. Y., 200 tons, State laboratory and school.

Trenton, N. J., 220 tons, State hospital building.

Tonawanda, N. Y., 325 tons, bridge.

Warren, Pa., 125 tons, refinery for United Refining Co.; Arthur G. McKee & Co., engineer.

Perry County, Pa., 800 tons, highway bridge; Lackawanna Steel Construction Co., low bidder.

Washington, 850 tons, Antacostia River bridge for Pennsylvania Railroad.

THE SOUTH

Paintsville, Ky., 300 tons, bridge.

Apalachicola, Fla., 2600 tons, State highway bridge.

Fort Pierce, Fla., 850 tons, precooling plant for Fort Pierce Development Co.

Fort Worth, Tex., 250 tons, bridge.

Clarksburg, W. Va., 190 tons, building for Pittsburgh Plate Glass Co.

CENTRAL STATES

Detroit, 350 tons, brewhouse for Tivoli Brewing Co.

Delhi, Ohio, 275 tons, lock No. 13 on Ohio River.

Huron, Ohio, 2000 tons sheet piling, Government project.

Paulding County, Ohio, 150 tons, highway bridge; bids March 16.

Shelby County, Ind., 130 tons, highway bridge.

Chicago, 600 tons, alterations for Marshall Field & Co.

Chicago, 700 tons, addition to Davis department store.

State of Illinois, 520 tons, highway bridges.

Pocahontas, Ill., 500 tons, bridge.

State of Iowa, 750 tons, four bridges; bids taken March 13.

State of Illinois, 525 tons, three bridges.

Milwaukee, 800 tons, filtration plant; bids March 20.

Milwaukee, 1700 tons sheet piling for filtration plant; bids March 20.

Prairie du Sac, Wis., 200 tons steel sheet piling for bridge protection; Wisconsin Bridge & Iron Co. low bidder.

Beloit, Wis., 500 tons, high school addition; bids indefinitely postponed on account of legal technicality.

Camp Douglas, Wis., 200 tons, military structures; bids opened March 2 rejected; new bids March 24.

Blackhawk, Wis., 640 tons, overhead crossing.

Hudson, Wis., 300 tons, overhead crossing.

WESTERN STATES

Adams County, Colo., 105 tons, State overhead bridge; bids March 19.

State of Colorado, 110 tons, highway work in four counties; bids March 19.

Newport, Ore., 1900 tons, State bridge and viaduct over Yaquina Bay; bids May 17.

Waldport, Ore., 150 tons, State bridge over Alsea Bay; bids April 5.

State of Oregon, 290 tons, bridge across Siuslaw River between Florence and Glenada; bids June 7.

State of Oregon, 670 tons, bridge over Umpqua River between Gardner and Reedsport; bids June 7.

Coos County, Ore., 165 tons, State bridge over Coquille River; bids March 22.

North Bend, Ore., 3710 tons, State viaduct over Coos Bay; bids April 26.

Fort Mason, Cal., 400 tons, pier shed.

FABRICATED PLATE

AWARDS

Boston, Mass., 850 tons, post office caissons, to Walsh's Holyoke Steam Boiler Works.

Indian Town Gap, Pa., 245 tons, two elevated tanks, to Pittsburgh-Des Moines Co.

Washington, 400 tons, for ship construction at Brooklyn and Philadelphia Navy Yards, to Lukens Steel Co. and Bethlehem Steel Co.

Redlands, Cal., 402 tons, 20 and 22-in. pipe, to Consolidated Steel Corpn.

NEW PROJECTS

San Francisco, 140 tons, pontoons for United States Engineers; bids under advisement.

Santa Cruz, Cal., 300 tons, tank.

Portland, Ore., 110 tons, lighthouse tender; bids under advisement.

Name Members of Code Authorities

WASHINGTON, March 13.—Capt. J. D. McIntyre has been appointed as a member of the planning and practice agency of the cast iron soil pipe industry code, and William Loeb, New York, has been appointed to a similar position for the copper and brass mill products industry. Captain McIntyre is an army officer assigned to special field duty in connection with army procurement and planning activities. Mr. Loeb, retired, was vice-president of the American Smelting & Refining Co.

National Steel Corpn. and subsidiaries in 1933 operated at net profit, after all charges, of $2,812,406, equivalent to $1.30 a share on capital stock outstanding. This compares with net earnings in 1932 of $1,662,919, equal to 77c. a share. In 1931 net profit amounted to $4,443,323, or $2.06 a share.

... PERSONALS ...

DANA SUMMERS has been elected president of the Chicago Steel & Wire Co., Chicago, succeeding J. B. GREEN who died April 24, 1933. For a number of years Mr. Summers was general manager of the Wilson Steel Products Co., Chicago, and in 1926 became engaged in automobile sales work. In 1928 he was made superintendent by the Chicago Steel & Wire Co. and early in 1933 he was elected a vice-president. Other appointments made by the board of directors are: LOREN F. COLLINS, vice-president; A. W. NELSON, secretary-treasurer, and H. E. JOHNSON, assistant secretary and assistant treasurer.

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MAJ. W. H. CROM, detailed from the United States Army, has been appointed administration member of the supervisory agency of the machine tool and forging machinery industry, succeeding NEAL W. FOSTER, who resigned March 2.

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HAROLD W. GOLDEN, sales engineer with William K. Stamets, Pittsburgh, machine tool dealer, has been appointed district manager of that firm's Cleveland branch located in the Rockefeller Building. Mr. Golden joined the Stamets organization in 1927, prior to which he had been employed for 12 years on engineering and production work. He received his engineering training at the University of Kentucky.

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RALPH G. CAULLEY has become associated with the Detroit district sales office of the Republic Steel Corpn. For the last 14 years he has been connected with the Wheeling Steel Corpn., the first two of which were with the Whitaker-Glessner Co., Portsmouth, Ohio, now a part of the Wheeling company. Since 1927 he has been connected with Wheeling's Detroit office.

DANA SUMMERS

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G. A. BAKER, formerly manager of the Buffalo office, has been transferred to the general offices of the Duriron Co., Dayton, Ohio, where he will specialize on sales of Durimet and Durco alloy steels. COL. M. W. SMITH, of the general offices, has taken over temporarily the management of the Buffalo office.

Cast Iron Pipe

Plymouth, Mass., has awarded 300 tons of 8-in. to R. D. Wood & Co.

Springfield, Mass., will close bids March 20 on about 270 tons of 8, 12 and 16-in. H. M. King is superintendent of Board of Water Commissioners.

Methuen, Mass., plans purchase of 10 and 6-in. for water supply.

National Cast Iron Pipe Co. has contract for 450 tons 8-in. from Tipton, Mo.

Manitou, Colo., plans about 14,000 ft. of 10-in. to replace present 6-in. line for water supply. A. O. Maltby, Manitou, is engineer.

American Cast Iron Pipe Co. is low bidder at $53,459 for quantity of 30-in. for Council Bluffs, Iowa.

Fincastle, Va., plans water pipe line system. Fund of $38,000 is being arranged through Federal aid.

Belleville, Ill., plans main trunk line from proposed waterworks station on Kaskaskia River, and new distributing mains. Fund of $2,000,000 is being arranged for entire project, including pumping plant, etc. Caldwell Engineering Co., Jacksonville, Ill., is engineer.

Jefferson City, Mo., plans extensions in water pipe line system and replacement of certain present lines. Fund of $833,270 is being arranged for this and other expansion and improvements in water system. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Oshkosh, Wis., is considering bids on 110 tons of 6-in. pipe and fittings.

Springfield, Ill., has awarded 2300 tons to Lynchburg Foundry Co.

Cook County, Ill., has placed 30,000 ft. of 12-in. with Lynchburg Foundry Co.

Georgetown, Ill., is in the market for 800 tons. George Harding is general contractor.

Hearne, Tex., plans pipe lines for extensions and improvements in water system. J. W. Berretta Engineers, Inc., National Bank of Commerce Building, San Antonio, Tex., is engineer.

Osakis, Minn., asks bids until March 19 for extensions in water pipe line system. Burlingame & Hitchcock, Minneapolis, are engineers.

Beverly Hills, Cal., asks bids until March 27 for 2600 ft. of 8 and 12-in. for water supply in La Cienega district. Salisbury, Bradshaw & Taylor, 714 West Tenth Street, Los Angeles, are engineers.

Pipe Lines

Arvin Gas Co., Arvin, Cal., R. L. Stockton, head, plans steel pipe line from natural gas fields at Mountain View, Cal., to Arvin and vicinity, with distributing lines for commercial supply. Cost about $55,000.

Northwest States Utilities, Inc., operated by Minnesota Northern Power Co., 831 Second Avenue South, Minneapolis, has secured contract from United States Engineer Office, Glasgow, Mont., for about 18 miles of steel pipe line from Glasgow to Fort Peck dam site, Missouri River, for gas service.

Willmut Gas & Oil Co., Hattiesburg, Miss., recently organized by Frank M. Tatum, Hattiesburg, and associates, has taken over Public Service Corpn. of Mississippi, same place, and plans extensions in steel pipe system for natural gas supply from Jackson, Miss., gas fields to Hattiesburg and neighboring communities, where franchise has been secured.

Los Angeles has taken bids on 290 tons of sheets for 22-in. pipe for the Metropolitan Water District.

PLANT EXPANSION AND EQUIPMENT BUYING

Shorter Work-Week Uncertainty Slows Up Tool Demand

EQUIPMENT buying on large scale in the automotive field was virtually brought to a halt last week by uncertainty as to Government action with respect to hours and wages. This stoppage is expected to continue until a decision is reached. Small orders, of course, are continuing, the National Acme Co. for example taking an order this week for six automatics from an unnamed automotive buyer. E. W. Bliss Co. reports an order from the Oldsmobile Co., Lansing, Mich., for a large double crank toggle press for fenders and body sections.

In Cincinnati, grinders and millers are leading in buyers' interest, with other types of machine tool in occasional demand. Jobbing work and repair part business are brisk.

The Harnischfeger Corpn., Milwaukee, has obtained a contract for three cranes for Boulder Dam, involving $250,000.

There is considerable demand for good used machinery. This week the plant of the Hy Press Casting Co., Cleveland, was sold at auction in bankruptcy proceedings and the equipment consisting of about 30 high grade and little used machine tools brought very good prices. Most of the tools were bought by consumers who outbid dealers.

◀ NEW ENGLAND ▶

Crown Brewing Co., South Boston, Mass., care of Henry L. Pierce, Nahant, Mass., president, recently organized, plans new brewery at first noted place, where property has been acquired. Equipment to be purchased will soon be arranged. Company is arranging for sale of stock totaling $1,000,000, considerable part of fund to be used for equipment. Norton P. Webber, Nahant, is secretary and treasurer.

Sewer Department, City Hall, Taunton, Mass., plans new sewage disposal works in Berkley district, including sludge machinery, purification equipment, power house, machine shop and other units. Fund of $1,000,000 is being arranged through Federal aid. Arthur L. Nelson, 31 St. James Avenue, Boston, is consulting engineer.

Board of Selectmen, Westwood, Mass., W. H. Spokesfield, chairman, school committee, plans manual training department in new multi-story senior and junior high school. Cost over $175,000.

T. D. Specialties Corpn., Boston, has been organized by Thomas P. McDermott and Mack Baskin, 37 Ware Street, Lowell, Mass., to manufacture valves and kindred engineering specialties.

Town Council, St. Johnsbury, Vt., R. W. Orebaugh, town manager, Muncipal Building, plans installation of storage tanks, pumping equipment, pipe lines, etc., for municipal water system. Fund of $110,000 is being arranged. Barker & Wheeler, 36 State Street, Albany, N. Y., are consulting engineers.

◀ NORTH ATLANTIC ▶

New York Rapid Transit Corpn., 385 Flatbush Avenue Extension, Brooklyn, has authorized fund of $178,186 for purchase of new machinery and equipment for increase in electric power.

Commercial Solvents Corpn., 230 Park Avenue, New York, is considering extensions and improvements in plant at Terre Haute, Ind., with new unit for distillery service. Cost over $70,000 with equipment.

Fang-Grip Corpn., College Point, L. I., has been organized by Louis Clarke, 11950 Sixth Avenue, and John Wenzel, 1335 135th Street, both College Point, to manufacture metal specialties.

Superior Die Cutting Co., 160 Varick Street, New York, has leased floor in building at 161-65 Perry Street for new plant.

Utica Radiator Corpn., 55 West Forty-second Street, New York, manufacturer of steam and hot water radiators, etc., with headquarters at Utica, N. Y., has leased 16,000 sq. ft., in building in Newtown Creek district, Long Island City, for new factory branch, storage and distributing plant.

Board of Education, Westfield, N. J., informs THE IRON AGE that the new school to be erected will be a grade school and will require no manual training equipment, as previously reported.

Radio Corpn. of America, Inc., Rockefeller Plaza, New York, has plans for new radio photogram station near New Brunswick, N. J. Cost over $75,000 with steel towers, power equipment and other apparatus.

Schenley Distillers' Corpn., 20 West Fortieth Street, New York, is carrying out expansion and improvements at plant of Pepper Distillery Co., Lexington, Ky., a subsidiary; cost about $400,000 with machinery. Improvements also are being made at distillery of George T. Stagg Co., Frankfort, Ky., another subsidiary.

King's Blade Co., Inc., Brooklyn, has been organized by Joseph Entel, 353 Stone Avenue, and associates, to manufacture razor blades, razors and kindred products.

Sheffield Farms Co., Inc., 524 West Fifty-seventh Street, New York, has filed plans for extensions and improvements in two four-story dairy products storage and distribution plants at 614-44 West 126th Street. Cost $200,000 with mechanical-handling, loading and other equipment.

A. Dredge Ruling Pen Co., 75 Gold Street, New York, manufacturer of mechanical drafting instruments, has leased space in building at 350-56 West Thirty-first Street for new plant.

Kings Wine Association, Inc., New York, Alexander Lacakes, president, recently organized, has leased four floors in building at 21-27 New Chambers Street for new winery, blending and bottling works.

Board of Education, Garden City, N. Y., plans manual training department in new multi-story high school. Fund of $975,000 is being arranged for building and equipment.

Kingston-Conley Electric Co., Jersey City, N. J., care of Edwin F. Smith, 1 Exchange Place, representative, has been organized by Frederick S. Kingston and Brooks L. Conley, Jersey City, capital $100,000, to manufacture electrical equipment and supplies.

Chevrolet Motor Co., Westmoreland and Stokley Streets, Philadelphia, has let general contract to Builders, Inc., Market Street National Bank Building, for one-story addition, about 30,000 sq. ft. floor space, to local factory branch. Cost about $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 20 for one rotary shear (Schedule 1929-R), two monorail hoists (Schedule 1932), one power press brake machine, all motor driven (Schedule 1930), for New York or Philadelphia navy yards; 200 trunnion bolt assemblies, 200 cable impulse assemblies, 200 rear mounting post assemblies, 500 trigger operating assemblies, 300 trigger motor units and 100 gun charging handles (Schedule 1903), one motor-driven milling machine (Schedule 1939-R) for Philadelphia yard.

Constructing Quartermaster, Air Depot, Middletown, Pa, asks bids until March 21 for new air corps shop, hangar with reconditioning and repair facilities, and operations building at local air field.

Robert E. Harrison, Inc., Emerald and Hagert Streets, Philadelphia, manufacturer of platers' equipment and supplies, has leased about 8000 sq. ft. in building at Amber and Willard Streets, for new plant to increase capacity.

◀ WESTERN PENNA. ▶

A. Overholt & Co., Broad Ford, Pa., plans extensions and improvements in distillery, including additional equipment. Power house will be enlarged and new boilers and auxiliaries installed. Cost over $75,000 with equipment. R. C. Perry is general manager.

H. J. Heinz Co., 1062 Progress Street, North Side, Pittsburgh, has approved plans for expansion and improvements in local plant and branch factories at Bowling Green, Ohio, and Medina, N. Y., to include new ovens, mixing, canning and other equipment. Cost over $50,000 with machinery.

Libbey-Owens-Ford Glass Co., Charleston, W. Va., plans new pumping plant, with 4 and 6-in. pipe lines from Kanawha River, for service at local works. Cost over $24,000 with machinery. Company headquarters are in Nicholas Building, Toledo, Ohio.

Pennsylvania Rubber Co., Jeannette, Pa., manufacturer of automobile tires and other rubber goods, will carry out expansion, converting storage building for production. New mixing, conveying and other equipment will be installed.

◀ OHIO AND INDIANA ▶

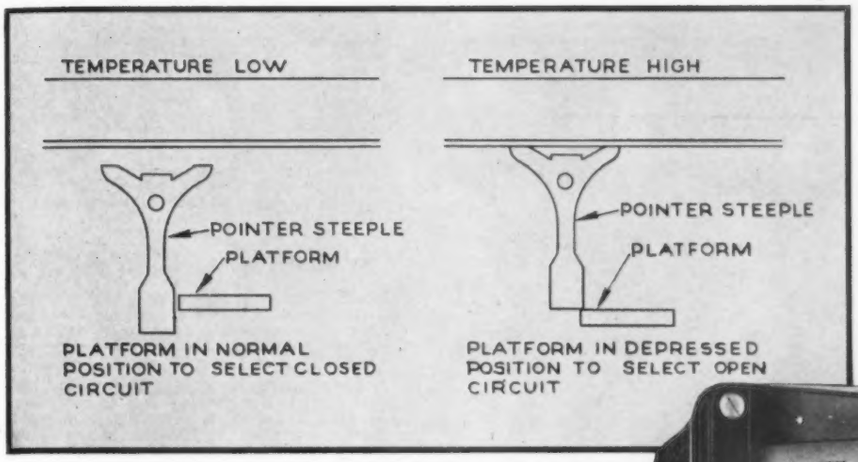
Inland Division of General Motors Corpn., 15 Coleman Street, Dayton, Ohio, manufacturer of automobile equipment, has asked bids on general contract for two one-story and basement additions, 25 x 100 ft., and 40 x 50 ft. Cost over $45,000 with equipment. G. C. Hillsmith & Co., 108 East Third Street, are architects.

Philip Carey Mfg. Co., Lockland, Ohio, manufacturer of insulation products, has asked bids on general contract for rebuilding one-story storage and distributing building, 80 x 100 ft., recently damaged by fire. Cost over $40,000, including overhead crane and other mechanical-handling equipment.

Pioneer Signal Advertising Devices, Inc., Columbus, care of Harley E. Eters, 3620 A.I.U. Building, representative, has been organized by D. L. Thompson and J. B. Rhodes, Columbus, to manufacture advertising mechanical specialties.

Industrial Rayon Corpn., West Ninety-eighth Street and Walford Avenue, Cleveland, is considering new branch mill at or near Fort Wayne, Ind., where negotiations are under way

Pyrometer Pointer Action Stabilized at Control Point



(Left) Sketch, showing how "shear-edge" action of pointer platform mechanism assures fractional degree control accuracy.

(Below) BRISTOL'S New Pyrometer Controller, Model 478, with self-contained mercury switches, for ranges up to 3000° F.

THIS new BRISTOL'S Model 478 Pyrometer Controller is so designed that the action of the pointer is stabilized at the control temperature. Here you will find no erratic pointer action which is so annoying in effecting precision control.

There are several other features. Note, in particular, (a) clean, non-arcing, non-oxidizing, non-corroding mercury-to-mercury electric contacts, sealed in glass; (b) no need for relays; (c) operating mechanism always visible; (d) accessibility of telechron motor, mercury switches and terminal block, simplifying field inspection without exposing control mechanism to dirt, fumes or misalignment; (d) full safety features; (e) simple and rugged working parts.

Write for Bulletin 389.

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BRISTOL'S CONTROL MAKES GOOD!

Since BRISTOL'S makes both control instruments and automatic valves, BRISTOL is in the favorable position of being able to develop the complete control system as a unit. It has the facilities correctly to engineer the desired system in order to achieve practical successful results.

TRADE MARK

BRISTOL'S

REG. U. S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889

with Fort Wayne Chamber of Commerce. Plant will include power house, machine shop, pumping station and other structures. Cost over $1,000,000 with machinery. A similar mill is also projected at Coshocton, Ohio, where Coshocton Business Men's Association is seeking suitable site. It will cost close to like sum. Christian, Schwarzenberg & Gaede Co., Union Building, Cleveland, is company architect.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 20 for five electric heat-treating furnaces (Circular 330), propeller hubs (Circular 331); until March 27, 1,955,000 lock washers, 215,000 burr washers, and 10,000 plain washers (Circular 342).

Canton Engraving & Electrotyping Co., Rex Avenue and Third Street, S. E., Canton, Ohio, plans rebuilding part of plant recently destroyed by fire. Loss about $45,000 with equipment.

Warner Collieries Co., Union Trust Building, Cleveland, will make extensions and improvements in coal-mining plant at Tiltonville, Ohio, including new equipment. Property has been closed for about two years and will soon be reopened. Tipple will be remodeled and improved.

Town Council, Oldenburg, Ind., asks bids until March 21 for equipment for extensions and improvements in municipal water system, including pumping machinery and auxiliary equipment, capacity 750 gal. a min., three miles of cast iron pipe line, and other equipment. Fund of $29,000 has been arranged. Charles Brossman, Chamber of Commerce Building, Indianapolis, is consulting engineer.

Richmond Turbine Pump Co., Inc., 800 South Seventh Street, Richmond, Ind., has been organized by Walter G. B. Weidner and Newton W. Long, to manufacture pumping machinery and parts and other mechanical equipment.

Bruckmann Co., Ludlow Avenue, Cincinnati, brewer, is planning extensions in branch brewery at Lexington, Ky., to include new equipment, storage tanks, etc. E. F. Pritchard is manager at Lexington.

BUFFALO DISTRICT

LeRoy Plow Co., LeRoy, N. Y., manufacturer of agricultural equipment, has arranged for acquisition of certain farm equipment patented and manufactured heretofore by United States Wind Engine & Pump Co., Batavia, Ill. Division will be removed to LeRoy plant, where production will be continued and expanded.

Sanitary Metal Cap Corpn., Syracuse, N. Y., has been organized by D. W. McPike, 564 Roberts Avenue, and associates, to manufacture metal caps, seals and kindred products.

Village Council, Frankfort, N. Y., plans new municipal electric light and power plant. Fund of $63,000 is being arranged. It is proposed to begin work soon.

Steel Co. of Canada, Ltd., Hamilton, Ont., has plans for two one-story additions for wire division and ingot mold department respectively. Cost about $150,000 with equipment.

WASHINGTON DISTRICT

Town Council, Marion, Va., plans new municipal electric light and power plant. Cost about $220,000 with equipment, including distribution system. Financing is being arranged.

Division of Purchase, Sales and Traffic, Department of Agriculture, Washington, asks bids until March 30 for new boiler plant, cold storage laboratory and other buildings at Bureau of Plant Industry, Horticultural Farm, Beltsville, Md. (Proposal 5700).

Bureau of Supply, Procurement Division, Treasury Department, Washington, asks bids until March 22 for wire rope, brass wire, copper wire, phosphor bronze wire, spring wire, steel wire, etc., for period, July-December (Class 22); until March 29, pipe fittings, same period, including beam clamps, conduit clamps, conduit bushings, conduit couplings, grease and oil cups, faucets, flanges, pipe hangers, lock nuts, nipples, pipe plates, railing fittings, valves, unions, etc. (Class 45).

Montgomery County Board of Education, Rockville, Md., plans manual training department in new three-story high school. Bids will soon be asked on general contract. Cost $175,000. H. W. Cutler, 1108 Sixteenth Street, N. W., Washington, is architect; James Posey, Baltimore Trust Building, Baltimore, is consulting engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 20 for two four-wheel trailers (Schedule 1942-R) for Sewall's Point, Va., Navy Yard; until March 23, power-driven portable machine (Schedule 1916), one upright drill (Schedule 1915-R), one dove-tailer machine (Schedule 1917-R), one grinder (Schedule 1914-R), one key-seating machine, all motor driven (Schedule 1020-R), motors, panels, controls, solenoids, and spare parts (Schedule 1912) for Eastern and Western yards.

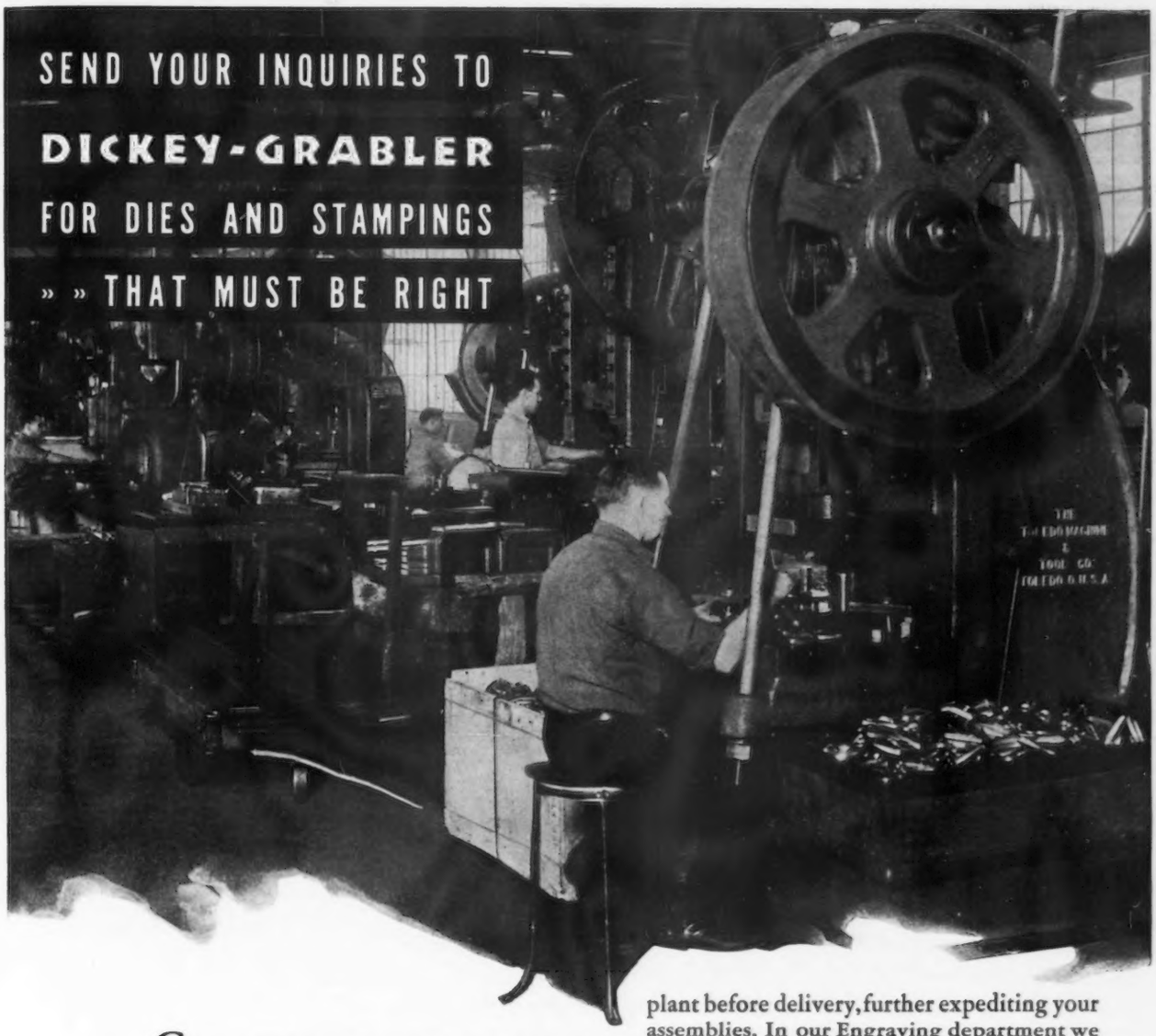
SOUTHWEST

State Department of Education, Jefferson City, Mo., plans vocational training shops at proposed industrial training school for boys at Boonville, Mo., with power plant, pumping station and other units for domestic and commercial service. A fund of $10,000,000 is being arranged, and State election has been called May 15 to approve bonds in that sum. David F. Wallace, 114 West Tenth Street, Kansas City, Mo., is supervising architect.

M. K. Goetz Brewing Co., Sixth and Albemarle Streets, St. Joseph, Mo., has acquired property at Kansas City, Mo., for new plant and plans early erection, to include power house, machine shop and other mechanical buildings. Cost over $450,000 with machinery.

Carter Oil Co., Exchange Bank Building, Tulsa, Okla., plans rebuilding part of gasoline refinery at Seminole, Okla., recently destroyed by fire, including storage and distribution department. Loss close to $1,000,000 with equipment.

City Council, Monroe City, Mo., plans extensions and improvements in municipal electric light and power plant, including new equipment. Fund of $60,000 is being arranged through Federal aid. W. B. Rollins & Co.,



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Railway Exchange Building, Kansas City, Mo., are consulting engineers.

City Council, Little Rock, Ark., plans new hangar, with repair and reconditioning facilities, and administration building at municipal airport. Fund of $67,000 has been authorized for work.

St. Marys Oil Engine Co., St. Charles, Mo., has been organized by J. A. and J. D. Anderson, St. Charles, to manufacture oil-operated engines and parts.

Common Council, McPherson, Kan., plans early call for bids for extensions and improvements in municipal electric light and power plant, including new 3000-kw. steam turbo, surface condenser and auxiliary equipment. Fund of $211,000 has been arranged through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Schepps Brewing Corpn., Dallas, Tex., has leased building on Young Street and will modernize for new plant. Cost over $85,000 with equipment.

Gladewater Corpn., Gladewater, Tex., plans rebuilding part of local oil refinery recently damaged by fire. H. B. Poff is general manager.

SOUTH CENTRAL

Buffalo Spring Distilling Co., Stamping Ground, Ky., has engaged Walter C. Wagner, Breslin Building, Louisville, architect, to complete plans for new plant and will soon take bids for buildings and equipment. Steam power house will be built, storage and distributing units, and machine shop. Entire project will cost about $150,000, instead of lesser amount recently noted.

City Council, Alexandria, La., will soon take bids for extensions and improvements in municipal power plant, including three high-pressure boilers, pipe lines for natural gas for fuel supply, three boiler feed pumps and other equipment. Fund of $250,000 has been secured through Federal aid. I. W. Sylvester is city engineer.

Auto Parts & Machine Co., Louisville, has been organized by J. L. Adams, 1111 Ray Avenue, and associates, to manufacture automobile parts and equipment, and operate a general machine works.

Stitzel Distilling Co., Louisville, plans new distillery on local site. Cost over $100,000 with equipment.

City Council, Knoxville, Tenn., W. A. Cockrum, chairman, municipal power committee, plans early erection of large central substation in connection with municipal power project. Unit will cost over $700,000 with equipment. Fund of $3,225,000 has been arranged for entire development.

Common Council, Middleboro, Ky., will soon take bids for new municipal electric light and power plant, including four Diesel engine-generating units and auxiliary equipment, and electrical distribution system. Fund of $328,000 has been arranged through Federal aid. R. Husselman, Hippodrome Building, Cleveland, is consulting engineer.

SOUTH ATLANTIC

Lombard Iron Works & Supply Co., Augusta, Ga., has arranged for lease of former factory of Standard Looms, Inc., East Spartanburg, S. C., and will remodel for new branch plant.

Orange State Oil Co., Sanford, Fla., has plans for new bulk oil storage and distributing plant on waterfront, including steel tanks, dock, pipe lines, etc. Contract for dock, 40 x 125 ft., has been let to Ravenal Engineering & Construction Co., Sanford. Entire project will cost over $90,000 with equipment.

John F. Morton Stone Contracting Co., 923 Dunbar Street, Charlotte, N. C., plans rebuilding stone-working and finishing plant recently destroyed by fire. Loss over $85,000 with machinery.

City Council, Rock Hill, S. C., plans new municipal electric light and power plant, including two Diesel engine or steam engine-generating units, 4000 kw. capacity, and auxiliaries. Federal financing for $529,000 is being arranged.

City Council, Elizabeth City, N. C., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for water supply and drainage project. Fund of $182,000 is being arranged through Federal aid.

MIDDLE WEST

Wonder Heater Co., Niantic, Ill., care of V. O. Jones, Niantic, president, recently organized to manufacture heating stoves and equipment, parts, hot-water equipment, etc., plans early operation of local factory. Company is arranging financing for $250,000, part of fund to be used for plant and equipment.

Fuhremann Canning Co., Appleton, Wis., food canner, has let general contract to Oscar Boldt Construction Co., 217 South Badger Avenue, city, for extensions and improvements in branch plant at Lanark, Ill., to include new steam power house and other units. Additional machinery will be installed, with mechanical-handling, circular hoist and kindred equipment. Cost about $45,000 with machinery. A. J. Hamilton, Appleton, is company superintendent, in charge.

Thermals Controls Corpn., 565 West Washington Boulevard, Chicago, has been organized with capital of 1000 shares stock to manufacture heat regulators and kindred heating control equipment, headed by Samuel J. Baskin and Eugene A. Delson.

United States Engineer Office, St. Paul, Minn., asks bids until April 11 for electric equipment for lock and dam No. 4, Mississippi River, near Alma, Wis., including gasoline-electric standby power unit and accessories, electric tow-haulage equipment, transformers and regulators, switching equipment, control switch cabinets, air signal equipment, power line, switching, instruments, etc. (Circular 101).

Common Council, Onawa, Iowa, asks bids until March 19 for equipment for extensions and improvements in municipal electric light and power plant, including 415-kw. Diesel engine-generator and accessories, cooling water system, pumping machinery and auxiliary equipment. Fund of $50,500 has been arranged. Nixon & Reynolds, Grain Exchange Building, Omaha, Neb., are consulting engineers.

General American Tank Car Corpn., 230 South Clark Street, Chicago, plans rebuilding

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ARMCO

Stainless Steels

part of car repair shop at Packers Avenue and West Forty-first Street, recently destroyed by fire. Loss about $45,000 with equipment.

Lehigh Portland Cement Co., Mason City, Iowa, will carry out extensions and improvements at local mill, including electrification of number of operating units. Main offices are at Allentown, Pa.

Town Council, Coon Rapids, Iowa, asks bids until March 27 for equipment for new municipal electric light and power plant, including two or more Diesel engine-generator units, cooling and exhaust equipment, switchboard and instruments, fuel oil equipment, etc.; also equipment for electrical distribution system. Fund of $114,000 is available. H. L. Cory, Redick Tower Building, Omaha, Neb., is consulting engineer.

Milwaukee Malleable & Grey Iron Works, 2773 South Twenty-ninth Street, Milwaukee, has placed contract with Hy. Schmidt Corpn., 1924 North Twenty-second Street, for plant additions and alterations, to cost about $20,000.

Trustees of Campbellsport, Wis., expect to ask bids soon for construction of waterworks plant costing $65,000 and sewerage system costing $59,000, designed by Jerry Donohue Engineering Co., 608 North Eighth Street, Sheboygan, Wis. James Farrell is village clerk.

Milwaukee Sewerage Commission, Jones Island, Milwaukee, closes bids March 29 for air compressor equipment for extension to sewage disposal plant, steam or Diesel engine type, with capacity of 50,000 cu. ft. per min., and alternate bids on one additional unit. John H. Fowles is acting chief engineer.

MICHIGAN DISTRICT

Applied Arts Corpn., Grand Rapids, Mich., manufacturer of automobile equipment and accessories, has purchased factory on Lane Avenue, and will remodel for new plant. Additional equipment will be installed to provide about 25 per cent increase in output. R. F. DeBoer is general manager.

American Black Granite Co., Ashland, Wis., has leased properties of Verde Antique Marble Co., near Ishpeming, Mich., idle for some time past, and plans early reopening. Quarrying and other equipment will be installed.

Saginaw Premier Brewing Co., Saginaw, Mich., has plans for new brewery at Center and River Streets, comprising group of one to six-story units. Cost about $275,000 with machinery. Cowles & Mutscheller, Saginaw, are architects.

Parker-Wolverine Co., 5203 Martin Avenue, Detroit, has been organized by William Cornelius, 2177 East Milwaukee Avenue, and associates, capital $120,000, to manufacture enameled metal products.

City Council, Niles, Mich., has applied for Federal aid for $325,000 for new municipal electric light and power plant and will begin work soon. Equipment to be installed is being arranged by Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer.

PACIFIC COAST

Douglas Aircraft Co., 3000 Ocean Park Boulevard, Santa Monica, Cal., has let general contract to L. B. Norman, 1034 Seventeenth Street, city, for one-story addition, 125 x 300 ft. Cost over $50,000 with equipment. S. B. Barnes, 803 West Third Street, Los Angeles, is consulting engineer.

Western Cooperage Co., American Bank Building, Portland, has let general contract to Austin Co. of California, Inc., Oakland, Cal., for plant at Fresno, Cal., for production of wire-bound kegs, barrels, etc. Cost about $55,000 with equipment.

California Grape Products Co., 85 Second Street, San Francisco, Horace O. Lanza, head, plans new winery at Delano, Cal., including power plant, machine shop and other buildings. Cost about $135,000. Company has recently acquired 10-acre tract for plant.

Anchor Brewing Co., 1610 Harrison Street, San Francisco, is planning to rebuild part of plant recently destroyed by fire. Loss about $40,000 with equipment.

School District No. 1, 810 Dexter Street, Seattle, E. H. Holmes, business manager, plans extensions and improvements in mechanical shop and storage warehouse. Cost about $35,000 with equipment. A. M. Allen, Seattle, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 23 for 25,000 ft. brass pipe (Schedule 1928) for Mare Island Navy Yard.

Board of Education, Pomona, Cal., has plans for new one-story vocational shop unit at local high school. Cost about $21,000 with equipment. E. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Hunt, Mirk & Co., 114 Second Street, San Francisco, consulting engineers, has plans for new distillery in Sacramento Valley district, for company whose name is temporarily withheld. Equipment purchases will be made by engineers at early date. Plant will cost about $65,000 with machinery.

Spokane, Portland & Seattle Railway Co., Commerce Building, Portland, has approved plans for new 2,000,000-bu. grain elevator at Vancouver, Wash., including elevating, conveying, screening and other mechanical equipment. Cost about $1,000,000 with machinery. John S. Metcalf Co., 105 West Adams Street, Chicago, is consulting engineer.

FOREIGN

Ministry of Industry, Government of Poland, Warsaw, plans shipbuilding and repair plant at Port of Gydnia, including drydock, with structural, machine and other mechanical shops, power house, etc. Cost over $500,000 with equipment.

Ministry of Public Works, Government of West Australia, Perth, Australia, will receive bids until April 19 for power plant equipment, including one 25,000-kw. turbo-alternator with accessories, condenser and auxiliary equipment, boilers, fuel economizers, air heaters, pumping machinery, coal pulverizing equipment, high and low-tension switch gear and other steam and electric equipment.

Fokker Aircraft Co., Ltd., Amsterdam, Holland, has acquired manufacturing rights for new commercial transport plane of Douglas Aircraft Co., Santa Monica, Cal., for all European countries, except Russia, and British Dominions, with exception of Canada, and plans expansion. Fokker company will continue production of regular line of aircraft, as heretofore, including units of steel tubular fuselage construction.

Tool Distributors' Supervisory Agency

THE Supervisory Agency of the Machine Tool and Equipment Distributing Trade, as provided in the code, is as follows:

J. W. Wright, Colcord Wright Machinery & Supply Co., St. Louis.

J. Roy Porter, Marshall & Huschart Machinery Co., Chicago.

Marshall Prentiss, Henry Prentiss & Co., New York.

Stanley Motch, Motch & Merryweather Machinery Co., Cleveland.

W. S. Dyson, Hallidie Machinery Co., Seattle.

C. E. Moore, Herberts-Moore Machinery Co., San Francisco.

G. H. Cherrington, Brown & Zortman Machinery Co., Pittsburgh.

TRADE NOTES

CHICAGO FLEXIBLE SHAFT CO. showed for 1933 a combined net profit of $189,515 after depreciation, Federal taxes and loss of $53,729 by foreign subsidiaries. This is equal to $1.05 a share on the $5 par value capital stock outstanding. In 1932 the company had a net profit of $22,759, after loss of $61,954 by foreign subsidiaries.

Orin F. Torbron is now with the Lamson & Sessions Bolt Co., Birmingham, and will represent the company in Texas and the Southwest.

Sundstrand Machine Tool Co., Rockford, Ill., reports, as of Dec. 31, surplus of $318,437. Current assets total $251,045, including $37,784 cash and $158,055 inventory. Current liabilities are $16,317.

ALUMILITE

ALUMINUM COLORS INCORPORATED

INDIANAPOLIS, INDIANA

Announces

That its basic patent, No. 1,526,127, on the Alumilite coloring process, has recently been sustained by the United States District Court for the Eastern District of New York.

•

Aluminum Colors Incorporated owns many other patents which cover the coating of aluminum and its alloys, coloring the same, and other features of the Process and Products.

•

Aluminum Colors Incorporated is prepared to take all proper legal steps for the full protection of its rights.

•

Aluminum Colors Incorporated will be pleased to consider the grant of a license to those desiring it.

•

Inquiries Invited

ALUMINUM COLORS INCORPORATED

INDIANAPOLIS, INDIANA

•

Y. S. & T. Co. Issues Annual Report for 1933

THE Youngstown Sheet and Tube Co. reports a loss for the year of $8,342,901.11 after all charges, but before deducting difference between cost and face value of bonds purchased for retirement. This, in the sum of $527,372.50, heretofore considered as earnings for the year under a recent request of New York Stock Exchange, is now credited direct to surplus rather than to income account. This loss compares with $14,060,750.64 before or $13,272,783.14 after taking into account difference between cost and face value of bonds purchased for retirement, in 1932, and $7,094,577.23 before and $7,040,899.73 after taking into account difference between cost and face value of bonds purchased for retirement, in 1931.

Net sales for 1933 amounted to $49,436,509.60, as compared with net sales for 1932 of $31,798,672.88 and for 1931 of $59,487,008.27.

In 1933 operations were 29.8 per cent of steel ingot capacity, as compared with 13.4 per cent in 1932 and 32.6 per cent in 1931.

Further liquidation of inventories and long-term receivables enabled the company to close the year with cash and investments in United States and sundry marketable securities of $14,124,405.78, being approximately the same as at Dec. 31, 1932. Total current assets at the end of the year amounted to $59,184,118.21 with current liabilities of $5,407,621.68, showing a current ratio of 10.9 to 1.

Expenditures during the year for improvements and betterments to plants amounted to $2,351,839.12. The major betterments in the Chicago district were at the Indiana Harbor Works and consisted of new equipment for cold rolling at the tin mill, extension of merchant mill facilities for rolling and handling alloy steels, and additional tie plate units. In the Youngstown District a railroad spike plant was added at the Campbell Works. In addition, several small expenditures were made to improve quality and further to diversify products.

The company is continuing its efforts to diversify products and contemplates during 1934 the extension of the range of sizes made on its electric weld tube mill so that it will be able to produce electrically welded pipe in sizes from 8⅝ in. to 26 in. in diameter. The board of directors is giving consideration to the installation of further units as circumstances justify.

Midvale Co. Proposes Capital Reduction

MIDVALE CO. and subsidiaries report sales for the year exceeded those in 1932 by 11 per cent. The value of orders received was 96 per cent greater than in 1932, and the amount of unfilled orders on the books Dec. 31, 1933, was $1,639,423, compared with $374,638 at the beginning of the year. Operations for the period, after providing $460,000 for reserve for depreciation, yielded a net profit of $28,348.56. In 1932, after reserving the same amount for depreciation, there was a net loss of $245,782.05. Net current assets increased during the year $448,351.05.

The company's net current assets and investments as of Dec. 31, 1933, amount to $7,712,908.04, of which $5,300,083.11 is cash in banks and on hand, and $415,432.07 is represented by marketable securities and investments net of reserves. After careful consideration it was the opinion of the board of directors that the liquid assets exceed the present and immediate future needs of the company, and they have proposed that the stated capital of the company be reduced from $14,574,621.02 to $10,574,621.02, and that the reduction in stated capital, $4,000,000, be distributed to the stockholders of the company in the proportion of $20.00 per share.

G. E. Makes Encouraging Preliminary Report

A PRELIMINARY report presented on March 2, 1934, to the board of directors of the General Electric Co. shows that sales billed during the fourth quarter of 1933 amounted to $39,211,122, compared with $34,112,816 for the same quarter of 1932, and were the largest for any quarter since the second quarter of 1932. Total sales billed for the year 1933 were $136,637,268 compared with $147,162,291 for 1932.

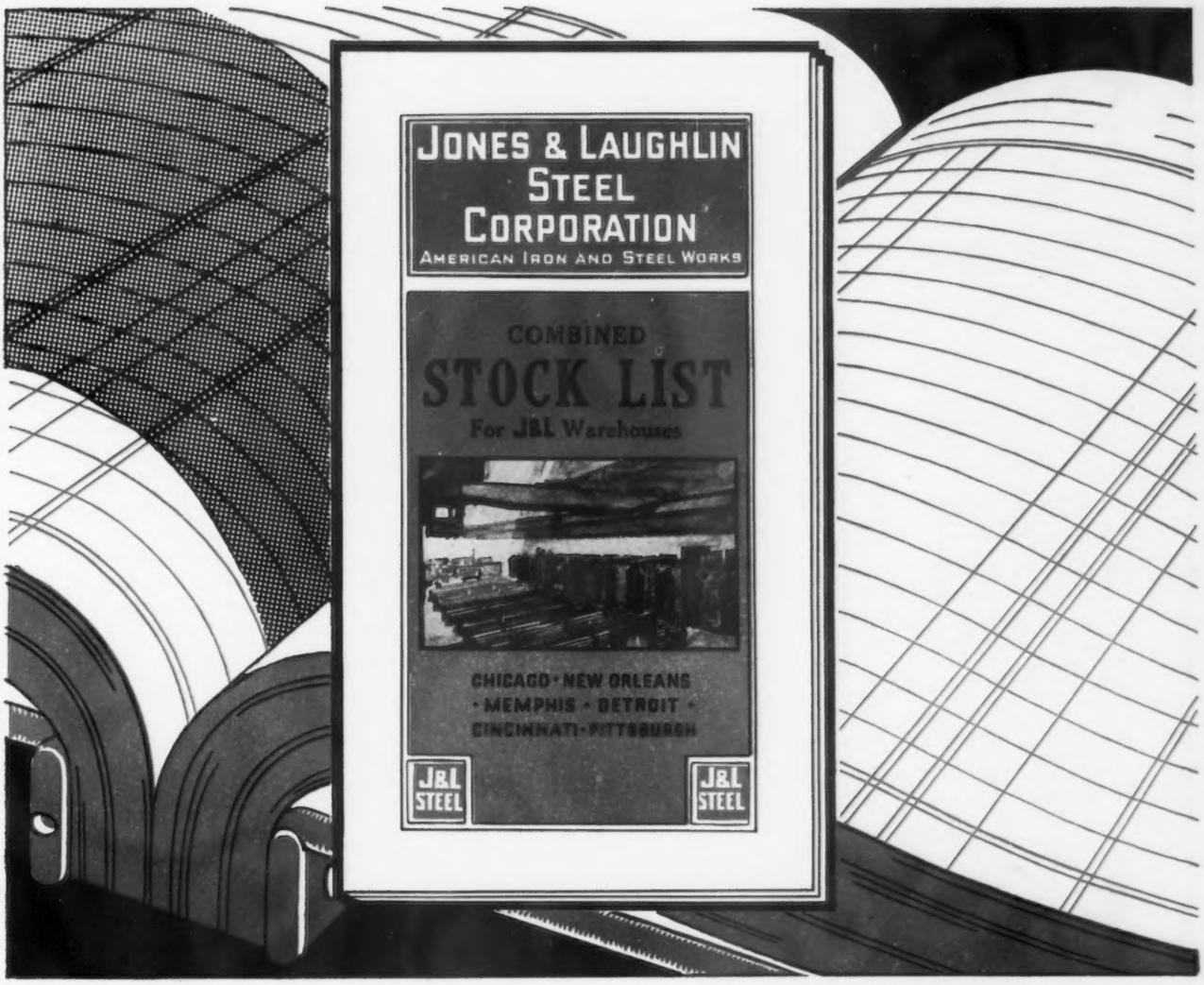
Earnings for the year 1933 available for dividends amounted to $13,429,739 compared with $14,404,110 in 1932.

Orders received during 1933 exceeded shipments for the first time since 1929, leaving a greater amount of unfilled orders at Jan. 1, 1934, than the year before. Orders for January and February, 1934, exceed those for the same months last year by approximately 49 per cent.

Between March 1 and Dec. 31, 1933, 8363 employees were added to the company's payrolls, and the total annual payroll rate increased approximately $17,448,000.

The board decided to recommend to the stockholders at the annual meeting on April 17 approval of a profit-sharing plan which embraces all employees and on which the executives of the company have been working for some years.

Pacific Car & Foundry Co., Seattle, Wash., control of which has been held by the American Car & Foundry Co., New York, since April, 1924, has again reverted to local ownership. The company has been reorganized and the following officers elected: Paul Pigott, president; H. N. Curd, vice-president and general manager; William Pigott, vice-president and treasurer, and W. S. Bassage, secretary and assistant treasurer.



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AMERICAN IRON AND STEEL WORKS
JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA

J&L WAREHOUSES

CHICAGO	CINCINNATI	DETROIT	NEW ORLEANS	PITTSBURGH
Virginia 1600	Main 2324	Plaza 0470	Franklin 1131	Hemlock 1000

LOUISVILLE—Magnolia 1693 . . . Stock of Bars for Concrete Reinforcement and Bar Fabricating Yard

MEMPHIS—6-4936 . . . Distributing Warehouse for Pipe, Sheets, Spikes and Wire Products. Reinforcing Bar Warehouse and Fabricating Shop

PHONE

Electric Gas Cleaning for the Tata Blast Furnaces

(Concluded from page 15)

each 50 ft. long, 15 ft. wide and 28 ft. high.

Each pretreater chamber has six banks of plate electrodes consisting of plates suspended lengthwise 9 in. apart. Wire electrodes are suspended between the plates. Mechanical rapping gear is provided for all electrodes, the rapping being accomplished by a pawl lifting a small rod against a spring which drives the rod sharply against the plate, and in the case of the wires the entire frame for one bank is lifted and allowed to drop.

After leaving the pretreaters the gas passes through eight secondary coolers 14 x 65 ft. These are provided with slat baffles and the gas temperature is here brought down to within 5 deg. F. of the service water temperature. As about 98 per cent of the total dust removal is done in the pretreater the water from the secondary cooler is quite clean.

The final treater has two banks of plate and wire electrodes but no rapping gear. This stage removes all entrained water and operates under wet conditions, as the gas is saturated in the secondary coolers.

A central control house for the transformers and rectifiers with their instruments as well as all blast furnace instruments is located between the plant and the blast furnace high line, the operating floor being at the high line level which is the main route of communication between the furnaces. The instrument layout is patterned after the one at Krupp's Borbeck plant. The plant will come into operation in August, 1934.

Ludlum Steel Co. Earned Profit in 1933

LUDLUM STEEL CO., Watervliet, N. Y., reports net earnings for the year 1933 after deduction of depreciation and taxes, amounting to $161,000 as compared with a loss of $474,000 in 1932, a net improvement of $635,000. Including cash amounting to $524,000, current assets as of Dec. 31, 1933, totaled approximately $2,800,000 as compared with current liabilities of $219,000, a ratio of approximately 13 to 1.

During the year 1933, total sales increased 59 per cent over those of 1932. The sales of special products which Ludlum has developed and patented showed a much greater percentage of increase during the year. In the case of Silcrome stainless steel, the increase in sales as compared with the year 1932 amounted to 99 per cent, and in the case of Silcrome valve steels, 78 per cent.

To protect its market position in certain lines and to provide an outlet for certain new products developed by its research laboratories, the company, in 1933, exercised its option to acquire controlling interest in The Forging & Casting Corpn., Detroit.

During the year important contracts were entered into with Acme Steel Co., Chicago, Superior Steel Corpn., Pittsburgh, and Wallingford Steel Co., Wallingford, Conn. The company becomes a source of supply for stainless steels covered by its patents which the companies above mentioned secure in semi-finished form, for conversion into finished flat rolled products.

From June to December the total number of working employees was increased 61 per cent, and during the month of December the company's day workers, comprising 80 per cent of all employees, were given employment averaging over 35 hours per week as compared to an average of less than 30 hours for similar personnel in the industry as a whole. In July, wages of all hourly workers and salaries of lower paid employees were advanced 15 per cent, and the 40 hour maximum week was adopted for all employees throughout the organization with the exception of the executive and sales departments.

Crucible Steel Co. Cuts Loss, Raises Surplus

CRUCIBLE Steel Co. of America reports an operating profit for 1933 of $2,811,182.36. After depreciation, interest charges, etc., this becomes a net loss for the year of $354,749.83. The net loss reported by the company for the preceding year of 1932 was $3,613,615.96.

Because of advance in the value of securities on hand and also because of profits resulting from the sale of securities, the total surplus as of Dec. 31, 1933, was $22,781,343.83, an increase of more than $4,000,000 during the year.

During the first six months of 1933, the company's production was about 30 per cent of normal capacity. During the last six months of 1933, it was approximately 50 per cent.

In line with its adherence to NRA, the number of employees increased 67½ per cent during the year and wage and salary payrolls increased 183 per cent.

JUST BETWEEN US TWO

Two Gold Specks in a Sieveful of Mud

MORE wearily than Gray's plowman wended his way, we are anthony-adversing through Dun's 3,364-page financial register, checking up our lists.

The week's terl unoithed two gems. In Sands Springs, Oklahoma, a furniture and jewelry store is run by Muleskin Brown. In Dustin, Oklahoma, a man with the romantic name of Coy Truelove wastes himself on the grocery business.

Boom in Economic Crooning

ONLY a week or so ago Vincent Astor wrote us a personal letter about subscribing for his paper, "Today." Now Frank Vanderlip wants us to take his paper, "Economic Forum." Any day now we expect an invitation from Al Smith to take "The New Outlook."

More and more of God's favored chillun are equipping themselves with megaphones.

Weekly Blurb

FEBRUARY was the eighth consecutive month to show a circulation gain over the preceding month.

Don't Make 'Em Eggshaped

LIKE the man who was astonished to learn that all his life he had been speaking prose, springmakers will be flabbergasted to learn that they turn out *objets d'art*. The Mar. 6 New York Tribune carries this headline, "Piece of Spring Wins Art Show Beauty Award."

It seems the Museum of Modern Art is having a Machine Art Exhibition. A section of steel spring (American Steel & Wire) took first prize, an airplane propeller (Aluminum Co.) second, and a heap of ball bearings (SKF) took third. Docs Dewey and Richards did the picking, assisted by a lady. Mrs. Roosevelt? Strange to say, you're wrong. It was Amelia Earhart. *Amelia, the paper says, "was delighted by the beautifully shaped ball bearings." Seems to us that in the matter of shape there* wasn't much leeway. Anything but round would have been wrong.

We Like 'Em, Too

The superintendent of a New Hampshire machine shop writes:

> *"The advertisements in The Iron Age are well displayed and the layouts are so distinct that the eye catches instantly everything on the page without unnecessary fatigue."*

But It Stopped Ticking

EVERY time we read any one of the "New Dealers" explanations of what it is all about, we get the jitters. Nor are we reassured by their promise that if they find they are wrong they will try something else. Once we tried to repair a 75c alarm clock that insisted on alarming at 3 o'clock when the hands pointed to six and vice versa. We tried a lot of things and finally cured the clock of its annoying habit of ringing at 3 A.M. But the clock stopped going altogether.

The most illuminating, reassuring statement we have seen recently, touching upon the economic situation, is contained in the article, "Merchandising Steel in a New Era," by Republic Steel's L. S. Hamaker. If you overlooked it, turn to page 28-A of the Mar. 1 IA. It's a honey.

A Plea for "Little Booklet"

PURISTS froth at the mouth every time they see the phrase "little booklet." Let 'em froth, say we. "Little booklet" is a useful, exact definition. The diminutive "let" applies to thickness. A booklet is a bound collection of a limited number of pages. "Little" means a small page size. A big booklet is a thin book of large page size. And if Doc Vizetelly doesn't like it . . . . .

—A. H. D.